KEYENCE

96171E

Digital Photoelectric Sensor

PS-N10 Series

User's Manual

Read this manual before use.
Keep this manual in a safe place for future reference.

Introduction

This manual describes the basic operations and hardware functions of the PS-N10 Series.
Read this manual carefully to ensure safe performance and function of the PS-N10 Series.
Keep this manual in a safe place for future reference.
Ensure that the end user of this product receives this manual.

■ Symbols

The following symbols are used in this manual to alert you to matters concerning the prevention of injury and product damage.
Always read these sections.

DANGER	**It indicates a hazardous situation which, if not avoided, will result in death or serious injury.**
WARNING	**It indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
CAUTION	**Failure to follow the instructions may lead to minor or moderate injury.**
NOTICE	**Failure to follow the instructions may lead to product damage as well as property damage.**

Important **Indicates cautions and limitations that must be followed during operation.**

Point **Indicates additional information on proper operation.**

Reference Indicates tips for better understanding or useful information.

Indicates reference pages.

Safety Precautions

General Precautions

⚠ WARNING	• **This product is only intended to detect objects. Do not use this product for the purpose of protecting a human body or a part of the human body.** • **This product is not intended for use as an explosion-proof product. Do not use this product in a hazardous location and/or potentially explosive atmosphere.** • **This product uses DC power. Do not apply AC power. The product may explode or burn if an AC voltage is applied.**

NOTICE	• **Do not wire the amplifier line along with power lines or high-tension lines, as the sensor may malfunction or be damaged due to noise.** • **When using a commercially available switching regulator, ground the frame ground terminal and ground terminal.** • **Do not use the PS-N10 Series outdoors, or in a place where extraneous light can enter the light-receiving element directly.** • **Due to individual dispersion characteristics and the difference in sensor head models, the maximum sensing distance or displayed value may not be the same on all units.**

Precautions on Regulations and Standards

■ CSA Certificate

PS-N10 series complies with the following CSA and UL standards and has been certified by CSA (Class 2252 05 / Class 2252 85). (CSA mark is attached only to the sensor amplifier certified by CSA.)

- Applicable standard: CAN/CSA C22.2 No.61010-1
  UL61010-1

  Pollution Degree: 3
  Overvoltage Category: I
- Use the following power supply.
  CSA/UL certified power supply that provides Class 2 output as defined in the CEC (Canadian Electrical Code) and NEC (National Electrical Code), or CSA/UL certified power supply that has been evaluated as a Limited Power Source as defined in CAN/ CSA-C22.2 No. 60950-1/UL60950-1
- Use this product at the altitude of 2000 m or less.
- Indoor use only.
- The sensor head cable and the sensor head connection cable must be installed with avoiding mechanical damage (e.g.: crushing).
- The power/input-output cable for amplifier unit is for internal wiring only.
- The following cables are rated 30 V.
  - sensor head cable
  - sensor head connection cable
  - power/input-output cable for amplifier unit

  Install these cables where it is separated from the circuit over 30 V.

■ CE Marking

Keyence Corporation has confirmed that this product complies with the essential requirements of the applicable EC Directive, based on the following specifications.
Be sure to consider the following specifications when using this product in a member state of the European Union.

● EMC Directive (2004/108/EC)

- Applicable standard EMI : 60947-5-2, Class A
  EMS : 60947-5-2
- When connecting with the NU-CL1, always install in a conductive enclosure (control panel, etc.), and wrap a ferrite core (E04SR401938 manufactured by Seiwa Electric Mfg. Co., Ltd.) one turn around the sensor head cable.
- When extending the Sensor Head Cable of the PS-47(C)/49(C)/05/52(C)/55(C)/56/58, cover the entire Sensor Head Cable with conductive piping (for example with metal piping). Also, ground the end part of the piping (the sensor amplifier side).

Remarks: These specifications do not give any guarantee that the end-product with this product incorporated complies with the essential requirements of the EMC Directive. The manufacturer of the end-product is solely responsible for the compliance of the end-product itself according to the EMC Directive.

Manual Organization

1	**Before Using**	Outlines the package contents and identifies part names and functions.
2	**Installation and Connection**	Provides procedures for installing sensor amplifiers and cables, as well as operating precautions.
3	**Basic Operation**	Explains basic instructions for operating and setting the sensor amplifiers.
4	**Settings for Advanced Functions**	Describes settings for advanced functions of the PS-N10 Series.
5	**Specifications**	Provides the specifications, circuit diagrams and dimensions of the PS-N10 Series.
6	**Appendix**	Provides the troubleshooting instructions and initial settings (default values).

<Points for Using This Manual>

- When you **"Forgot the operation methods"** or **"Want to find the operation procedures"** **→ Go to pages 3-2, 4-2**
- When you **"Want to try out the PS-N10"** **→ Go to Chapters 2 and 3**
- When you **"Want to fully utilize the various functions"** **→ Go to Chapters 3 and 4**
- When you **"Want to know the meanings of terms used"** **→ Go to Chapter 6 (Index)**
- When you **"Want to troubleshoot the PS-N10"** **→ Go to Chapter 6 (Troubleshooting)**

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Before Using

1

This chapter outlines the package contents and identifies part names and functions.

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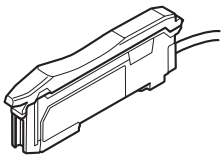
Checking the Package Contents

Before using the PS-N10 Series, make sure that the following equipment and accessories are included in the package.
We have thoroughly inspected the package contents before shipment. However, in the event of missing, defective or broken items, contact your nearest KEYENCE office.

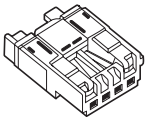
Sensor Amplifier

PS-N10 Series



Sensor amplifier x 1

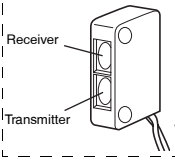
Instruction manual x 1



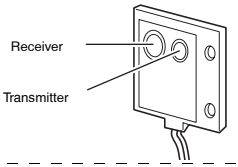
Sensor head connector x 1

Sensor Head

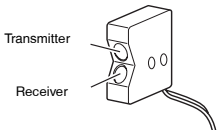
PS-45



PS-46



PS-47/PS-47C*1



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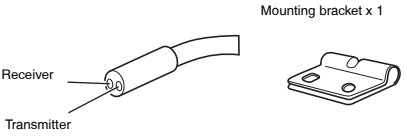
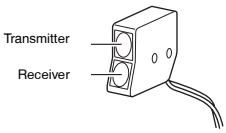
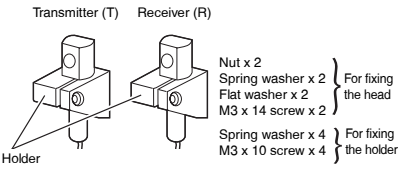


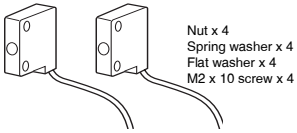
PS-49/PS-49C*1



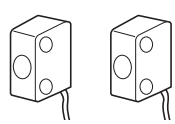
PS-05



PS-52/PS-52C*1



PS-55/PS-55C*1



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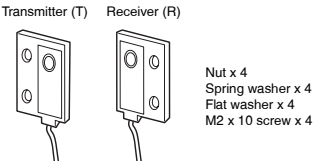

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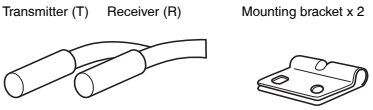
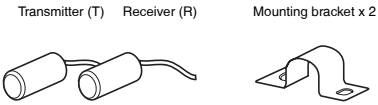
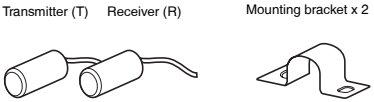


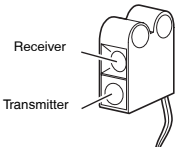
PS-201/PS-201C*1



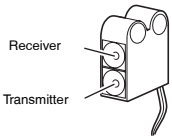
PS-202



PS-205

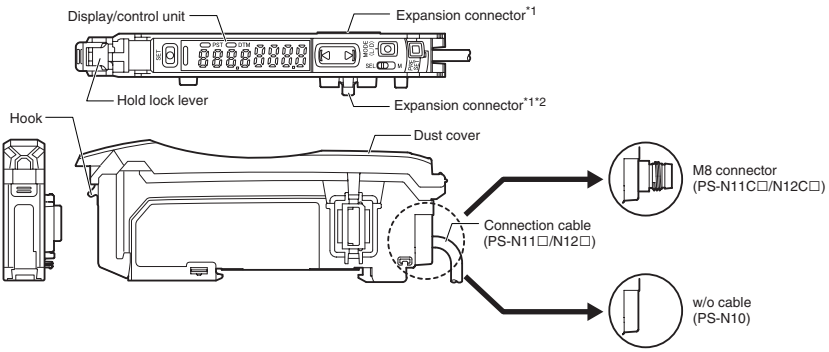


PS-206



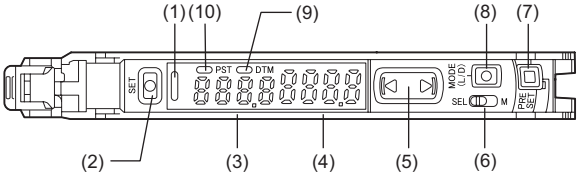
*1 A sensor head connector is attached to the end of the cable for the sensor heads with model names containing the suffix C.

Sensor Amplifier



*1 When shipped from the factory, the expansion cover is installed.
*2 This is not installed on the main unit (PS-N11N/N11P/N11CN/N11CP).

Display/control unit



* Not available for the PS-N10.

Item		Description
(1)	Operation indicator	Indicates the current output (detection) status.
(2)	[SET] button	Used when setting sensitivity, etc. "Adjusting the Sensitivity" (page 3-5)
(3)	Setting value (Displayed in green)	Displays a setting value or advanced setting item in this area of 7-segment green indicators.
(4)	Current value (Displayed in red)	Displays the current value (received light intensity), or a selection from advanced settings, in this area of 7-segment red indicators.
(5)	Manual button	Used to adjust the setting value or select an option.
(6)	Power select switch	Changes power modes. SEL: Allows you to set a power mode using the "Changing Power Modes" function of basic setup. M: Fixes the power mode to "MEGA mode". "Locking in MEGA Mode" (page 3-21)
(7)	[PRESET] button	Used for presetting or setting values or parameters. "Adjusting the Sensitivity" (page 3-5)
(8)	[MODE] button	Used for toggling L-on/D-on, proceeding to advanced settings, or confirming selections.
(9)	DTM indicator	Lights when a DATUM mode is in effect. "DATUM1 mode" (page 4-9) "DATUM2 mode" (page 4-11)
(10)	PST indicator	Lights when preset value is set. "Adjusting the Sensitivity" (page 3-5)

MEMO

Installation and Connection

2

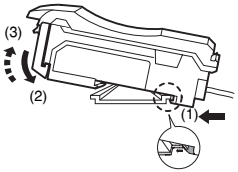
This chapter provides procedures for installing sensor amplifiers and cables, as well as operating precautions.

2-1 Installing Sensor Amplifiers..... 2-2
2-2 Connecting the Sensor Amplifier to the Sensor Head..... 2-5
2-3 Mounting the Sensor Head..... 2-7

Mounting the Sensor Amplifier

Mounting on a DIN rail

1 **Align the claw at the bottom of the main body with the DIN rail, as shown on the right. While pushing the main body in the direction of the arrow (1), push down in the direction of arrow (2).**



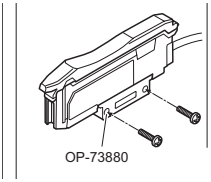
2 **To release the amplifier, raise the amplifier body in the direction of arrow (3) while pushing in the direction of arrow (1).**

Installation on a wall

Reference This method applies only when using the main unit independently. If the main unit is connected with an expansion unit(s), use the method of mounting on a DIN rail.

1 **Mount the amplifier on the amplifier mounting bracket (OP-73880, sold separately), using the same manner as "Mounting on a DIN rail".**

2 **Secure the unit with two M3 screws as shown in the illustration.**



Connecting multiple amplifiers

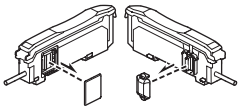
Up to 16 expansion units can be connected to 1 main unit.

⚠ WARNING	**Mount on DIN rail and install on metal surface when connecting multiple amplifiers or mounting main units together.**

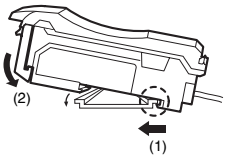
Point

- **Contact your nearest KEYENCE office when connecting a unit other than the N-bus (KEYENCE's wire-saving system) compatible sensor amplifier, including PS-N10 Series, or the NU Series communication module.**
- **Turn the power off before connecting multiple expansion units.**
- **Do not touch the expansion connector with your bare hands.**
- **When using the PS-N10 Series as a main unit, use the products within the expansion unit's power voltage range if the power voltage range of the expansion unit is narrower than the PS-N10 Series.**

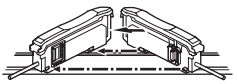
1 **Remove the protection covers from the main unit and expansion unit(s).**



2 **Mount the main unit and expansion unit(s) on the DIN rail.**

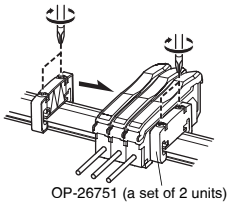


3 **Slide the main unit and expansion unit(s) together.**
Engage the 2 claws of the expansion unit with the recesses on the main unit side until you hear/ feel a click.



4 **Attach the separately sold end units (OP-26751: a set of 2 units) to the DIN rail in the same manner as step (2).**

5 **Secure the amplifiers between the end units.**
Tighten the screws at the top (2 screws × 2 units) with a Phillips screwdriver to fix the end units.

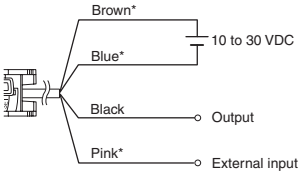


Wiring Diagrams for Sensor Amplifiers

Point

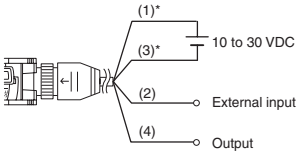
- **Be sure to turn off the power before wiring.**
- **Insulate each input or output cable that will not be used.**

■ Cable type (PS-N11☐/N12☐)

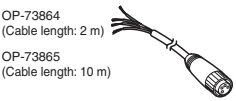


* PS-N11N/N11P only

■ M8 connector type (PS-N11C☐/N12C☐)



* PS-N11CN/N11CP only



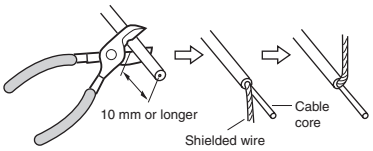
Pin and wire color table

Connected pin No.	Wire color
1	Brown
2	White
3	Blue
4	Black

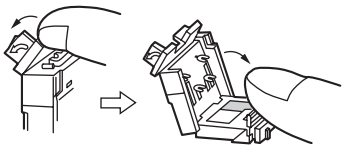
Reference Refer to "Circuit Diagrams" (page 5-4) for the input/output circuit diagrams.

Installing the Sensor Head Connector

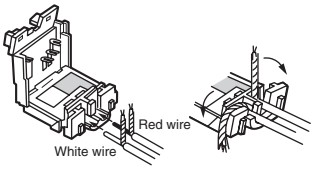
1 **Process the cable ends, as shown on the right. The core wire conductors are stripped so that they are exposed at the time of shipment. Be sure to process the cables without removing the insulation from the cable ends.**



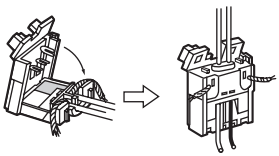
2 **Move the upper left part of the connector in the direction of the arrow and then open the connector.**



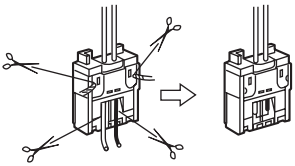
3 **Fully insert the cables with the shielded wires standing upright. Next, bend the shielded wires along the grooves in the direction of the arrow.**



4 **Close the connector to crimp the cables. Return the upper part of the connector to its original position and then lock it.**



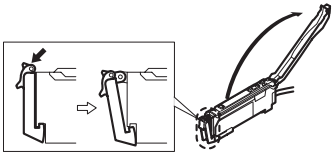
5 **Using nippers, cut off the ends of cables protruding from the connector.**



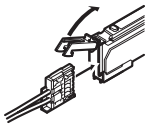
NOTICE	**Crimp the cables no more than three times. Excessively crimping the cables may result in a bad connection.**

Connecting the Sensor Amplifier to the Connector

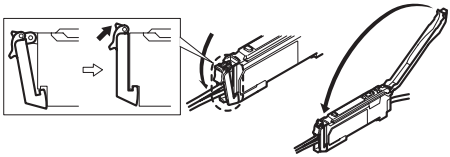
1 **Open the dust cover, and move the hold lock lever down.**



2 **Lift the hook up, and insert the connector completely.**



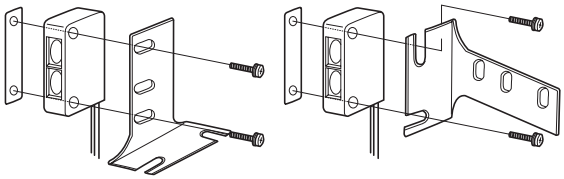
3 **Lower the hook to the position shown in the drawing, and pull up the hold lock lever.**



2-3 Mounting the Sensor Head

PS-45

Use the supplied fixing brackets. There are two ways to mount the sensor head. Make sure the tightening torque does not exceed 0.6 Nm.

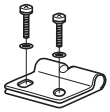


PS-46/52(C)/56

Use the supplied screws or other similar screws. Make sure the tightening torque does not exceed the following values:

PS-46/56: 0.3 Nm or less

PS-52: 0.15 Nm or less



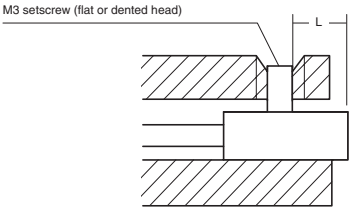
PS-47(C)/49(C)/55(C)

Install the M3 screws. Make sure the tightening torque does not exceed 0.6 Nm.

PS-48/58

Install the M3 screws when using the supplied fixing brackets.

Make sure to observe the following requirements when using setscrews to mount the sensor head:

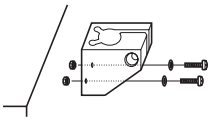


Model	L	Tightening torque
PS-48	5 mm or longer	0.15 Nm or less
PS-58	7 mm or longer	

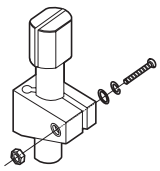
CAUTION	**Note If you place the reflective PS-48 in the mounting hole, it is affected by the light reflected from inside the hole. Place the front side of the PS-48 so that it sticks out of the mounting hole, as shown above.**

PS-05

When installing the holder, use the supplied screws and spring washers or other similar parts, as shown on the right. Make sure the tightening torque does not exceed 0.5 Nm.

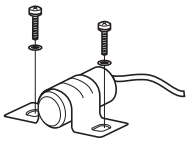


When fixing the PS-05 to the holder, use the supplied screw, nuts, spring washer, and flat washer or other similar parts, as shown on the right. Make sure the tightening torque does not exceed 0.5 Nm.



PS-201(C)/202

Use the supplied fixing bracket or similar bracket. Install the M3 screws.



CAUTION	**• Do not use setscrews to install the bracket.** **• Do not bend the 20 mm cable that runs from the end of the sensor head. Maintain a minimum bend radius of 25 mm.**

PS-205/206

Install the M4 screws. Make sure the tightening torque does not exceed 0.5 Nm.

CAUTION	**Do not bend the 20 mm cable that runs from the end of the sensor head. Maintain a minimum bend radius of 25 mm.**

Basic Operation

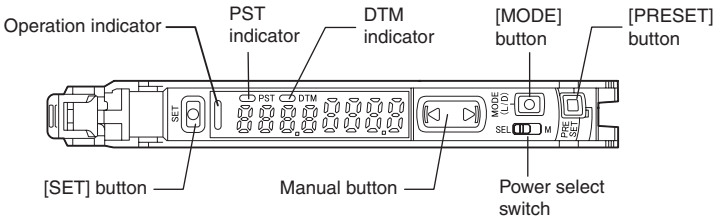
3

This chapter explains basic instructions for operating and setting the sensor amplifier.

3-1 Quick Reference 3-2
3-2 Switching Output 3-4
3-3 Adjusting the Sensitivity 3-5
3-4 Setting the Current Received Light Intensity to 0 (Zero Shift) .. 3-16
3-5 Loading the Recommended Settings (Recipe Function) ... 3-18
3-6 Initialization 3-20
3-7 Locking in MEGA Mode 3-21
3-8 Disabling the Key Operation 3-22

3-1 Quick Reference

The main setting operations are explained according to purpose. Refer to Chapter 4 for information on advanced function settings and explanations not given below.



Purpose		Description	Operation procedures	Reference page
Changing the output	1	Change the output. (L-on/D-on)	1. Press the [MODE] button. 2. Switch with the ▷ (◁) button.	3-4
Adjusting the sensitivity and integrating the display to "100" and "0"	2	Set the current received light intensity to "100". (Preset)	Reflective model: Press the [PRESET] button when a workpiece is present. Thrubeam/Retro-reflective model: Press the [PRESET] button when no workpiece is present.	3-6
	3	When preset is valid, register the received light intensity "0". (Work-preset)	After step 2, press the [PRESET] button + ▷ button in the state to be set as "0".	3-7
	4	Set the received light intensity slightly higher than when the setting was made, to "100". (Maximum sensitivity preset)	While the PST indicator is OFF, press and hold the [PRESET] button. Reflective model: When no workpiece is present. Thrubeam model: When a workpiece is present.	3-8
	5	Automatically register "100" and "0" when workpiece passes by. (Full Auto preset)	Press and hold the [PRESET] button while the PST indicator is OFF.	3-9
	6	Cancel the various preset functions.	Press and hold the [PRESET] button.	3-6
Adjusting the sensitivity	7	Set the setting value at the midpoint between the received light intensity values when a workpiece is present and absent. (2-point calibration)	1. Press the [SET] button once when a workpiece is present. 2. Press the [SET] button once when no workpiece is present.	3-11
	8	Set the setting value slightly higher than the received light intensity value at which the setting was made. (Maximum sensitivity calibration)	Reflective model: Press and hold the [SET] button when no workpiece is present. Thrubeam model: Press and hold the [SET] button when a workpiece is present.	3-12
	9	Set the setting value automatically when a workpiece is passing through. (Full auto calibration)	Press and hold the [SET] button while the workpiece passes through.	3-13
	10	Set the setting value to the base point where the workpiece is positioned. (Positioning calibration)	1. Press the [SET] button once when no workpiece is present. 2. Press and hold the [SET] button at the positioning point.	3-14
	11	Finely adjust the setting value directly.	Press the ▷ (◁) button.	1-5
Shifting the received light intensity to "0"	12	Set the current display to "0". (Zero shift)	Press the [PRESET] button + ▷ button when the PST indicator is OFF.	3-16
	13	Cancel the zero shift function.	Press and hold the [PRESET] button.	3-16
Loading the recommended settings	14	Load the recommended settings. (Recipe function)	1. Press and hold the [SET] button and [PRESET] button. 2. Display the LoAd screen with the ▷ (◁) button, and press the [MODE] button. 3. Select the recipe such as r-1 FALL with the ▷ (◁) button. 4. Press the [MODE] button to execute.	3-18

Purpose		Description	Operation procedures	Reference page
Initializing the settings	15	Initializing (Restore to factory default settings)	1. Press and hold the [SET] button and [PRESET] button. 2. Press the [MODE] button while on the rSt screen. 3. Select INIt with the ▷ (◁) button. 4. Press the [MODE] button to execute.	3-20
Switching to the maximum received light intensity power mode	16	Adjust the power mode to the MEGA mode.	Set the power select switch to SEL M.	3-21
Preventing incorrect operations	17	Activating the key lock	Press and hold the [MODE] button and the ▷ (◁) button simultaneously.	3-22
	18	Deactivating the key lock	Press and hold the [MODE] button and the ▷ (◁) button simultaneously.	3-22
	19	Activating the password-protected key lock	1. Press the ▷ (◁) button10 times while holding down the [MODE] button. 2. Input the password with the ▷ (◁) button. 3. Press the [MODE] button to execute.	3-23
	20	Deactivating the password-protected key lock	1. Press the ▷ (◁) button 10 times while holding down the [MODE] button. 2. Input the password with the ▷ (◁) button. 3. Press the [MODE] button to deactivate the key lock.	3-23
Others (Advanced function settings, etc.)	21	Setting the advanced functions	Press and hold the [MODE] button.	4-1
	22	Switching the display to extended display or received light intensity hold display, etc. (sub-display)	After setting the sub-display with the advanced function settings, press the [MODE] button twice.	4-20
	23	Resetting the following values * Received light intensity hold value * Excess gain hold value	Press and hold the [MODE] button and [SET] button.	4-22 4-24
Saving and loading the settings	24	Saving the settings (custom save)	1. Press and hold the [SET] button and [PRESET] button. 2. Display the SAvE screen with the ▷ (◁) button, and press the [MODE] button. 3. Select YES with the ▷ (◁) button. 4. Press the [MODE] button to execute.	4-32
	25	Loading the settings (user reset)	1. Press and hold the [SET] button and [PRESET] button. 2. Press the [MODE] button on the rSt screen. 3. Select USEr with the ▷ (◁) button. 4. Press the [MODE] button to execute.	4-33

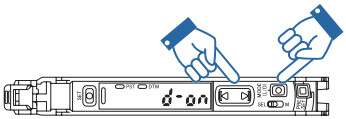
Output Switch (L-on/D-on)

This function configures when the output turns ON.

1 **When the current received light intensity is displayed, press the [MODE] button.**

The current output condition (L-on or D-on) is displayed.*1

2 **Press the button to switch the output condition, and then press the [MODE] button.**



Select "d-on" if you want to output the ON signal when the beam is blocked (a workpiece is present.) for a thrubeam model.
Select "L-on" if you want to output the ON signal when the beam is received (a workpiece is present.) for the reflective model.

The output condition is switched, and the current received light intensity is displayed.*2

*1 If you do nothing for 3 seconds or more or press the [MODE] button, the received light intensity display is automatically restored.

*2 When using the sub-display, the screen will switch between the current received light intensity → L-on/D-on screen → sub-display → current received light intensity and so forth each time the [MODE] button is pressed.

"Sub Display" (page 4-20)

Point

- **When in area detection mode, rising edge detection mode, or falling edge detection mode, this function works as a normally-open/normally-closed switch.**
  "Area detection mode" (page 4-14)
  "Rising edge detection mode" (page 4-16)
  "Falling edge detection mode" (page 4-16)

3-3 Adjusting the Sensitivity

In this manual, the value at which the sensor amplifier's ON/OFF output switches is expressed as the "setting value". The process of adjusting the setting value is expressed as "adjusting the sensitivity". This section explains the method of adjusting the sensitivity.

List of Sensitivity Adjustment Methods

The methods of adjusting the PS-N10 series sensitivity is largely classified into 2 types.

(1) Preset
At the same time as adjusting the sensitivity, the received light intensity can be calibrated to "100.0" or ".0" using simple operations.
This method can decrease the variation of the received light intensity depending on the contents of the detection and the workpiece, and is useful for predictive maintenance.
However, this is not suitable for when difference in received light intensity varies little with or without a workpiece, such as when detecting a transparent workpiece.

(2) Calibration
The sensitivity can be adjusted with simple operations. The received light intensity is not compensated.
This method is used to adjust without calibrating the received light intensity, or when highly accurate detection is required.
Calibration can be performed in the preset state.

Basic method of selecting sensitivity adjustment method

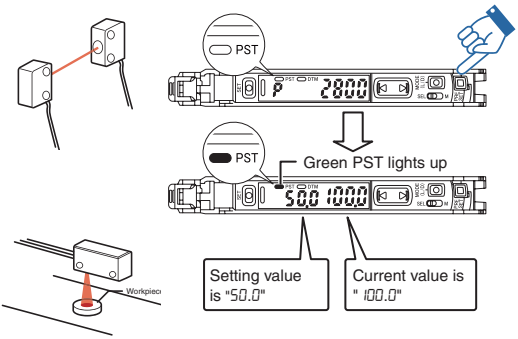
Sensitivity adjustment method	Usage		Function	Details	Reference
Preset	Basic	Using a thrubeam model	**Preset**	The sensitivity is adjusted just by pressing the [PRESET] button when a workpiece is absent.	3-6
		Using a reflective model	**Maximum sensitivity preset**	The sensitivity is adjusted just by pressing and holding the [PRESET] button when a workpiece is absent.	3-8
	At times like this	"100.0" and ".0" cannot be set regardless of whether a workpiece is present or absent.	Work-preset	The states at which to display "100.0" and ".0" can be set randomly.	3-7
		The moving workpiece moves quickly	Full auto preset	The sensitivity can be calibrated using a workpiece which moves at high speed.	3-9
Calibration	Basic	Using a thrubeam reflective model	**Two-point calibration**	The setting can be established just by pressing the [SET] button once when a workpiece is present and absent.	3-11
	At times like this	The moving workpiece moves quickly	Full auto calibration	The sensitivity can be calibrated using a workpiece which moves at high speed.	3-9
		Using in an easily contaminated environment	Maximum sensitivity calibration	This setting prevents malfunctions even when using in an easily contaminated environment.	3-8
		Using with positioning	Positioning calibration	A setting suitable for positioning can be made.	3-14
		Using with highly accurate detection	Percentage calibration	This is useful for calibrating from an external device, such as a PLC.	3-15

Preset Function

Enabling the preset function

When the PST indicator is not lit, press the [PRESET] button

The PST indicator lights in green. The current value is set to " 100.0" and the setting value is set to "50.0".



Disabling the preset function

When the PST indicator is lit, press and hold the [PRESET] button.

- The PST indicator turns off, indicating that the preset function has been disabled.
- Once the preset function is disabled, the setting value is recalculated while retaining the ratio of the setting value and received light intensity.

Work-Preset Function

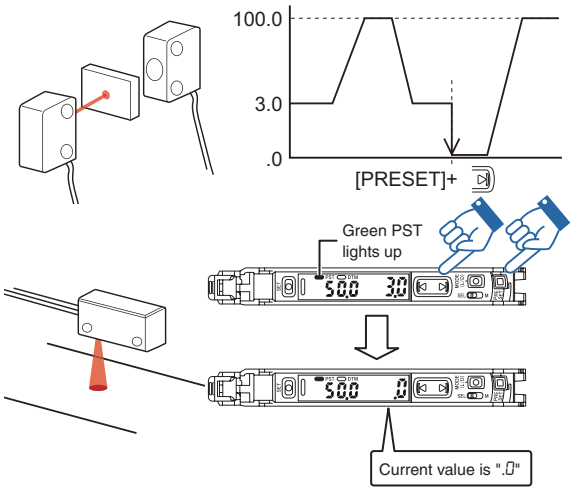
This function calibrates the current value to ".0". After the preset function has been executed with " 100.0" displayed, and then executing this function with ".0" displayed, 2 random set points can be calibrated to " 100.0" and ".0".

Enabling the work-preset function

▶ Impotant **The work-preset function can be used with the preset function (when preset is enabled).**

While the preset function is enabled, press the [PRESET] button and ⊡ button simultaneously.

The received light intensity at that point is set to ".0". The value set to " 100.0" using the preset function does not change.



Reference Even if the received light intensity is low during preset and is high during work-preset, the value is set to " 100.0" during preset and ".0" during work-preset. When the actual received light intensity increases, the display will approach ".0". (The preset saturation level is decreased with respect to " 100.0".)

Disabling the work-preset function

When the PST indicator is lit, press and hold the [PRESET] button.

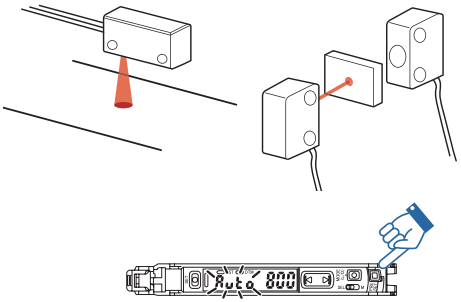
- The PST indicator turns off, indicating that the work-preset function has been disabled.

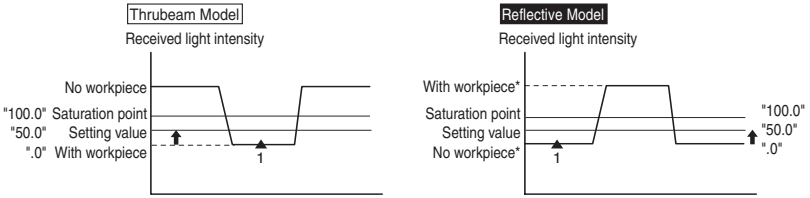
Maximum Sensitivity Preset Function

This function calibrates the reference state to ".0" and the state at which the received light intensity is slightly higher as " 100.0".
This function is useful with the reflective model to detect while using the background as a reference.

Enabling the maximum sensitivity preset function

1 **When no workpiece is present for the reflective model, or when a workpiece is present for thrubeam model, press and hold the [PRESET] button for 3 seconds or more while the PST indicator is OFF. Release the button when "Auto" flashes.**
Calibration is complete after the setting value flashes momentarily, and then stops (lights up). The PST indicator lights in green, and the setting value is set to "50.0".





* Where detection occurs on a target having a background, the maximum sensitivity setting ignores the background. Maximum sensitivity setting is not available if the background is more reflective than the workpiece.

Point

- **The maximum sensitivity preset function cannot be executed when the received light intensity is saturated (higher than the value listed in the Extension display on page 4-28). ("---- ----" will appear during step 1.)**

Disabling the maximum sensitivity preset function

When the PST indicator is lit, press and hold the [PRESET] button.

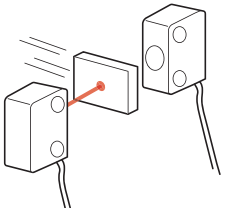
- The PST indicator turns off, indicating that the maximum sensitivity preset function has been disabled.

Full Auto Preset Function

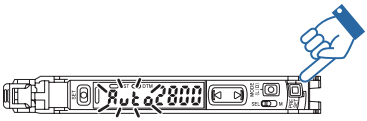
This function automatically judges 2 states (workpiece presence/absence, etc.), and calibrates the current value to " *100.0*" and "*.0*".
This is useful when the detector is moving at high speed, etc.

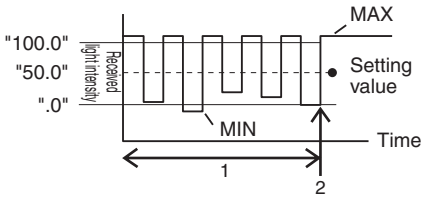
Enabling the full auto preset function

1 **When the PST indicator is OFF, continue pressing the [PRESET] button until "*Auto*" flashes while the workpiece passes through.**



2 **After the workpiece has completely passed through, release the [PRESET] button.**
Calibration is complete after the setting value flashes momentarily, and then stops (lights up).
The PST indicator lights in green, and the setting value is set to "*50.0*".





The area near the maximum value of the received light intensity while the [PRESET] button is pressed is set as " *100.0*", and the area near the minimum value is set as "*.0*".

Point **The full auto preset function cannot be executed when the received light intensity is saturated (higher than the value listed in Extension display on page 4-28). ("---- ----" will appear during step 2.)**

Disabling the full auto preset function

When the PST indicator is lit, press and hold the [PRESET] button.

- The PST indicator turns off, indicating that the full auto preset function has been disabled.

Point

Each preset function cannot be used when the following functions are set. Disable the function or change the setting before executing the preset function.

- **Zero shift function -> "Zero Shift Function" (page 3-16)**
- **Zero shift calibration -> "Adjusting the Sensitivity" (page 3-5)**
- **Zero shift input -> "External Input" (page 4-17)**
- **DATUM 1/2 mode -> "Restrictions for Sensitivity Settings in Each Detection Mode" (page 6-7)**
- **Rising/falling edge detection mode" -> "Restrictions for Sensitivity Settings in Each Detection Mode" (page 6-7)**
- **The preset function is not suited for transparent workpieces such as thrubeam models and other cases of detection with low light intensity differences.**
- **After changing any of the following settings, disable each preset function once and then execute again.**

  "Power Modes" (page 4-4)

  "Preset Saturation Function" (page 4-25)

  "Display Gain" (page 4-28)
- **If the received light intensity raw value is 50 or less (200 or less when the light intensity is set to FuLL), the display will be " 100.0" or less when the preset function is executed.**

Reference

- If the [PRESET] button is pressed when the preset function is enabled (PST indicator is lit), the current received light intensity changes to " 100.0" and the setting value does not change.
- Expansion units can be preset with operations from the main unit.

  "Common Key-Operations Function" (page 4-30)
- Periodic presetting is possible with signals input from an external source.

  "External Input" (page 4-17)
- With the preset function, a process is carried out to ignore minute received light intensity changes which do not affect the detection. The change amount to be ignored can be adjusted randomly.

  "Preset Saturation Function" (page 4-25)

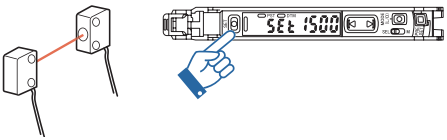
  If the sub-display is changed to "Extension", the original received light intensity can be confirmed even when using the preset function.

  Extension **->** "Sub Display" (page 4-20)

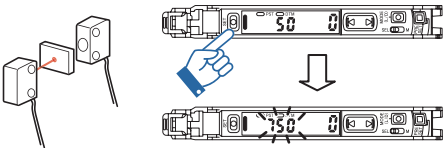
Two-point Calibration

Two-point calibration is the most basic method of sensitivity setting.
The setting value can be established by simply pressing the [SET] button once each when a workpiece is present. and when it is absent.

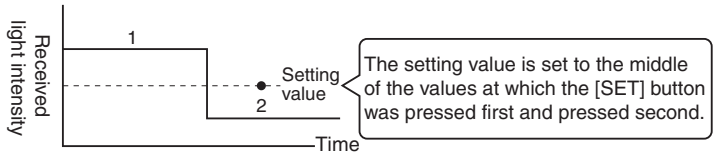
1 **Press the [SET] button once when no workpiece is present.**



2 **Press the [SET] button once when a workpiece is present.**
Calibration is complete after the setting value flashes momentarily, and then stops (lights up).
Press the button to adjust the setting value.



Reference Step 1 or step 2 may be performed first.

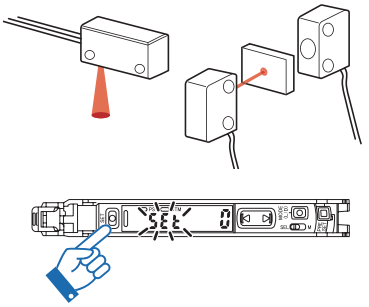

Received light intensity
1
2
Setting value
Time
The setting value is set to the middle of the values at which the [SET] button was pressed first and pressed second.

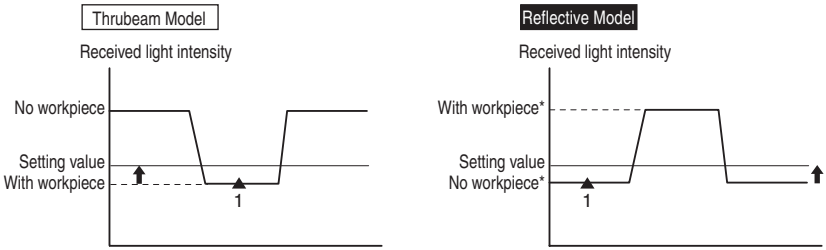
* If the difference between the 2 conditions is too small, "- - - -" flashes after calibration is complete.
However, the setting value will still established.

Maximum Sensitivity Calibration

This sensitivity setting method is useful if the received light intensity is reduced by dust or dirt.
The setting value is calibrated to be slightly more than the light intensity received when it is determined.

1 **When a workpiece is absent for the reflective model, or when a workpiece is present for the thrubeam model/retro-reflective model, press and hold the [SET] button for 3 seconds or more.**
Release the button when "SEt" flashes.
Calibration is complete after the setting value flashes momentarily, and then stops (lights up).
Press the ◁▷ button to adjust the setting value.



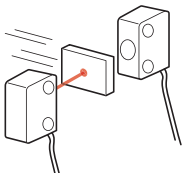


* Where detection occurs on a target having a background, the maximum sensitivity setting ignores the background. Maximum sensitivity setting is not available if the background is more reflective than the workpiece.

Full Auto Calibration

This method automatically sets sensitivity using a moving workpiece.
Sensitivity can be easily set by passing a workpiece without shutting down operating equipment.

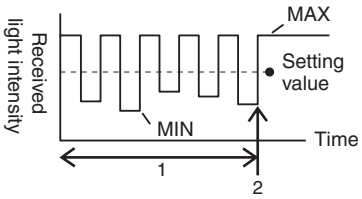
1 **While the workpiece passes through, press and hold the [SET] button until "SEt" flashes.**



2 **After the workpiece has completely passed through, release the [SET] button.**
Calibration is complete after the setting value flashes momentarily, and then stops (lights up).

Reference

- When performing two-point calibration on channel 2 of the 2-output type, set the channel switch to "2".

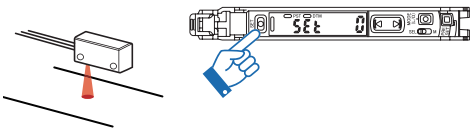


The setting value is determined as the middle value between the maximum and minimum light intensity received values obtained while holding down the [SET] button.

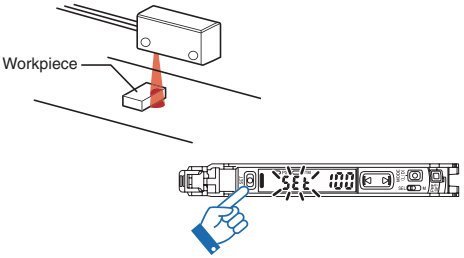
Positioning Calibration

This method is used when you want to position a workpiece.

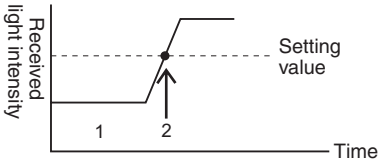
1 **Press the [SET] button once when no workpiece is present.**



2 **Position a workpiece such that its edge aligns with the center of the projecting beam. Then, press and hold the [SET] button for 3 seconds or more. Release the button when "SEt" flashes.** The setting value is determined as the value of light intensity received when the workpiece comes into position. Calibration is complete after the setting value flashes momentarily, and then stops (lights up).



Press the ◁▷ button to adjust the setting value.



Other Calibration Methods

Percentage calibration

A setting value is established with a percentage in respect to the current received light intensity. When used together with external calibration input, percentage calibration can be performed from an external device, such as a PLC, allowing highly accurate detection of transparent workpieces and small workpieces, etc.

Refer to "Sensitivity Setting" (page 4-4) for details.

Zero shift calibration

This sensitivity setting performs the zero shift function and basic calibration (two-point calibration / maximum sensitivity calibration / full auto calibration) simultaneously.
The lower of the received light intensity values specified at the time of sensitivity setting will automatically be set to 0.

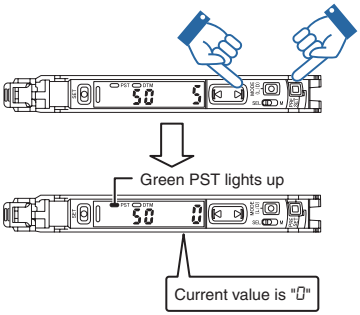
Refer to "Sensitivity Setting" (page 4-4) for details.

Zero Shift Function

This function adjusts the current received light intensity display to "0". It is primarily used with reflective sensor heads. If the received light intensity cannot be set to "0" when a reflective model is installed, this function can be used to set the received light intensity to "0" with no workpiece present. This makes the difference in received light intensity easier to distinguish.

Enabling the zero shift function

1 **When the PST indicator is off, press the [PRESET] button and button simultaneously.**
The PST indicator lights in green, and the received light intensity changes to "0".



Disabling the zero shift function

1 **When the PST indicator is on, press and hold the [PRESET] button.**
The PST indicator turns off, indicating that the zero shift function has been disabled.

Operating Principle of the Zero Shift Function

< For reflective models >

In applications for distinguishing colors or for detecting objects on a background, the received light intensity will not be "0" even when no workpiece is present.

Applying zero shift input to the lower level of received light intensity (with no workpiece present) enhances the detection display visibility.

Point

The zero shift function cannot be used in combination with the preset function. To use the zero shift function, make sure that the preset function is disabled (the PST indicator is not lit).

Reference

Zero shift of the expansion unit can be set from the main unit.

"Common Key-Operations Function" (page 4-30)

3-5 Loading the Recommended Settings (Recipe Function)

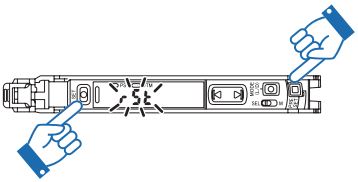
Recommended settings (recipes) for each sensor head and application are pre-registered in the PS-N10 Series.

Selecting Recipe

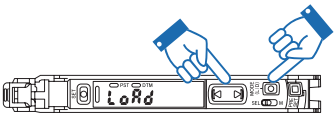
Point **When a recipe is loaded, all settings other than those registered in the recipe are returned to the default values. Complete all other settings after loading the recipe.**

1 **Press and hold the [SET] and [PRE-SET] buttons simultaneously for 3 seconds or more.**

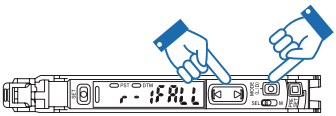
The "rSt" display flashes.



2 **Press the button to display "LoAd", and press the [MODE] button.**



3 **Press the button to select a desired recipe, and press the [MODE] button.**



After the settings are loaded, the screen displays "LoAd oE", which is then replaced with the current received light intensity.

List of Recipes and Recommended Sensor Heads

Recipe	Recommended head	Description
Fall (r-1 FALL)	Thrubeam model	To detect a falling workpiece. The falling edge of the received light intensity is detected, and output as one-shot. The received light intensity hold value can be confirmed by pressing the [MODE] button twice.
Percentage calibration (r-2 SEtP)	Thrubeam model	To use the external input and periodically compensate for the reduction in received light intensity due to contamination on sensor head face.
Zero-Shift (r-3 0SEt)	Reflective model	To use the external input and "0" the light intensity received without a workpiece present. The background received light intensity is set as 0 even when calibrating with the buttons on the display. (Zero Shift calibration)
MEGA (r-4 nEGA)	Reflective model	To 0 the lower of level received light intensity values in order to display higher values of received light intensity. The display can be extended up to 5 digits by pressing the [MODE] button twice.
AREA (r-5 ArEA)	Reflective model	This is recommended when outputting within a specific received light intensity range. When the [SET] button is pressed once at the reference received light intensity, the upper/lower setting value limits will be set at ±10% from the reference received light intensity.
0 DATUM (r-6 0dtn)	Thrubeam model	This is recommended when detecting a transparent workpiece. The received light intensity at the state with no workpiece is set as ". 0", and the displayed value is increased as the amount of light blocked by the workpiece increases. When the [SET] button is pressed or when calibrated with external inputs, the received light intensity -5% at that point is set as the setting value.

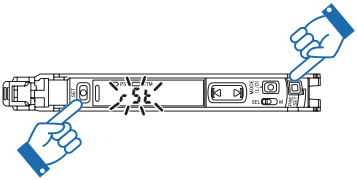
Reference Refer to "List of Recipe Function Settings" (page 6-6) for the details on the items set with recipe loading.

Initialization of Settings (Reset to Initial Values)

The sensor amplifier can be reset to the factory default settings.

1 **Press and hold the [SET] and [PRE-SET] buttons simultaneously for 3 seconds or more.**

The "rSt" display flashes.



2 **Press the [MODE] button.**

3 **Press the button to display " init ".**

4 **Press the [MODE] button.**

After the settings are initialized, the screen displays "oP", which is then replaced with the current received light intensity.

Reference Refer to "Factory Default Setting (Default Value) List" on page 6-5.

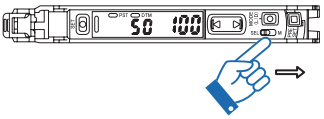
3-7 Locking in MEGA Mode

MEGA Mode Lock

The sensor amplifier can be locked in MEGA mode, such that it always operates in MEGA mode regardless of the power mode selected in the basic setup.

"Power Modes" (page 4-4)

1 **Slide the power select switch to the "M" side.**



Sliding the power select switch back to the "SEL" side restores the power mode that was set before sliding the power select switch to MEGA mode.

Reference

- When the amplifier is locked in MEGA mode, the power mode may not be changed in the basic setup, as indicated by the flashing of "Loc".

  "Power Modes" (page 4-4)
- Likewise, when the amplifier is in the key locked state, the power mode may not be changed, as indicated by the flashing of "Loc".

  "Key Lock" (page 3-22)

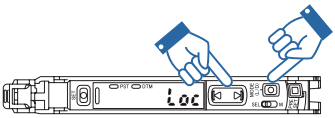
Key Lock

The key lock function disables all key operation to prevent unauthorized use.

Activating key lock

1 **Press and hold the [MODE] button and ◁ (or ▷) simultaneously for 3 seconds or more.**

The screen displays "LOC", disabling key operation and displaying the current received light intensity.



Deactivating key lock

1 **Press and hold the [MODE] button and ◁ (or ▷) simultaneously for 3 seconds or more.**

The screen displays "UNL", enabling key operation.

Reference

- The key operations on the expansion unit can be locked from the main unit.
  "Common Key-Operations Function" (page 4-30)
- By using the network unit NU series, key locks which could only be disabled via the network can be set. This function allows you to change only the necessary settings with a PLC and touch panel. Refer to the NU Series User's Manual for details.

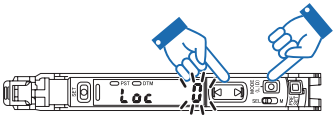
Key Lock with PIN Number

A PIN number can be set when activating key lock. Only users knowing the PIN number can operate the unit.

Activating key lock with a PIN number

1 **Press (or) 10 times while holding down the [MODE] button.**

The screen displays "Loc 0".



2 **Press the button to set a desired number (up to 4 digits).**

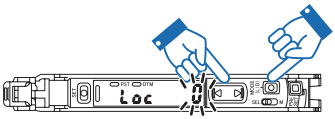
3 **Press the [MODE] button.**

The screen displays "Loc", disabling key operation and displaying the current received light intensity.

Deactivating key lock with a PIN number

1 **Hold down the [MODE] button while pressing (or) 10 times.**

The screen displays "Loc 0".



2 **Press the button to specify the PIN number, and then press the [MODE] button.**

The screen displays "unL", enabling key operation.

Point **If the PIN number is lost, contact your nearest KEYENCE office.**

Settings for Advanced Functions

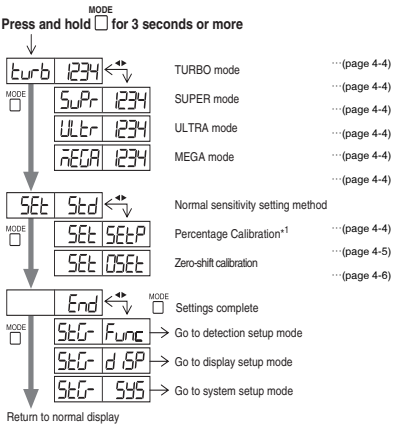
4

This chapter describes settings for advanced functions of the PS-N10 Series.

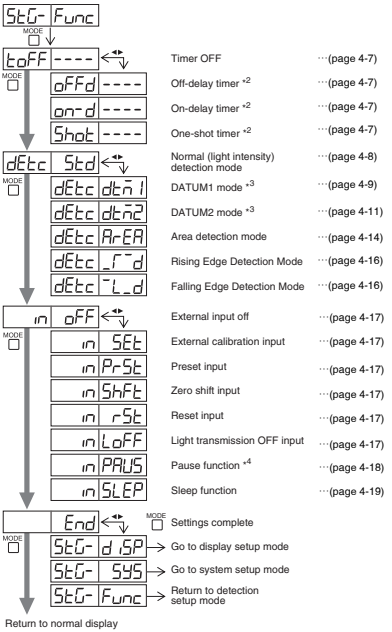
4-1 List of Settings 4-2
4-2 Basic Settings 4-4
4-3 Detection Settings (Func) 4-7
4-4 Display Settings (diSP) 4-20
4-5 System Settings (SYS) 4-27
4-6 Other Functions 4-31
4-7 Settings Save/Recall 4-32

4-1 List of Settings

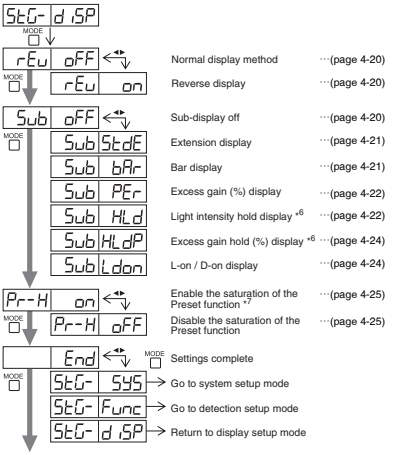
■ Basic Settings ···(page 4-4)



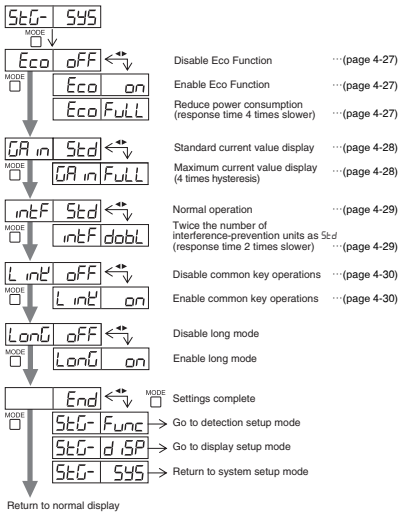
■ Detection Settings (Func) ···(page 4-7)


Timer OFF ···(page 4-7)
Off-delay timer *2 ···(page 4-7)
On-delay timer *2 ···(page 4-7)
One-shot timer *2 ···(page 4-7)
Normal (light intensity) detection mode ···(page 4-8)
DATUM1 mode *3 ···(page 4-9)
DATUM2 mode *3 ···(page 4-11)
Area detection mode ···(page 4-14)
Rising Edge Detection Mode ···(page 4-16)
Falling Edge Detection Mode ···(page 4-16)
*5
External input off ···(page 4-17)
External calibration input ···(page 4-17)
Preset input ···(page 4-17)
Zero shift input ···(page 4-17)
Reset input ···(page 4-17)
Light transmission OFF input ···(page 4-17)
Pause function *4 ···(page 4-18)
Sleep function ···(page 4-19)
Settings complete
Go to display setup mode
Go to system setup mode
Return to detection setup mode
Return to normal display

■ Display Settings (diSP) ···(page 4-20)


Normal display method ···(page 4-20)
Reverse display ···(page 4-20)
Sub-display off ···(page 4-20)
Extension display ···(page 4-21)
Bar display ···(page 4-21)
Excess gain (%) display ···(page 4-22)
Light intensity hold display *6 ···(page 4-22)
Excess gain hold (%) display *6 ···(page 4-24)
L-on / D-on display ···(page 4-24)
Enable the saturation of the Preset function *7 ···(page 4-25)
Disable the saturation of the Preset function ···(page 4-25)
Settings complete
Go to system setup mode
Go to detection setup mode
Return to display setup mode
Return to normal display

■ System Settings (SYS) ···(page 4-27)


Disable Eco Function ···(page 4-27)
Enable Eco Function ···(page 4-27)
Reduce power consumption (response time 4 times slower) ···(page 4-27)
Standard current value display ···(page 4-28)
Maximum current value display (4 times hysteresis) ···(page 4-28)
Normal operation ···(page 4-29)
Twice the number of interference-prevention units as Std (response time 2 times slower) ···(page 4-29)
*8
Disable common key operations ···(page 4-30)
Enable common key operations ···(page 4-30)
*9
Disable long mode
Enable long mode
Settings complete
Go to detection setup mode
Go to display setup mode
Return to system setup mode
Return to normal display

*1 You can press the MODE button to set between the range of -99P and 99P.
*2 Press the MODE button to set between the range of 1 and 9999 (ms).
*3 Press the MODE button to set the adjustment sensitivity to a range of between LEv 1 and LEv3 and set the warning level to a range of between 0P and 100P.
*4 Press the MODE button to switch between oFF/on/tEEP.
*5 This display does not appear on the cable-type expansion unit (PS-N12□) and the 0-line type (PS-N10).
*6 Press the MODE button to toggle between Std/P¯P_/b¯b_/P_b¯/P¯b_.
*7 Press the MODE button to set between the range of 100P and 200P.
*8 Main unit only.
*9 The PS-47(C), PS-48, PS-49(C), PS-58 and PS-206 do not support long mode. Do not select long mode when using these sensor heads.

Reference

- Press the MODE button and the ESC button simultaneously to return to the previous setting option.
- When the MODE button is held down, the settings menu will end.

Power Modes

turb 1234

Refer to page 4-2 "Basic Settings" for setting methods.

The detection stability will increase when the response time is delayed.
You can select from the following 4 power modes.
The response time slows down in the order of turb, SuPr, ULtr, nEGA.

Display	Power mode name	Response time
turb	TURBO mode (Default)	500 µs
SuPr	SUPER mode	1 ms
ULtr	ULTRA mode	4 ms
nEGA	MEGA mode	16 ms

Sensitivity Setting

SEt Std

Refer to page 4-2 "Basic Settings" for setting methods.

You can select from the following 3 sensitivity setting methods.

Display	Sensitivity setting method	Reference page
Std	Normal sensitivity setting (without correction) (Default)	3-5 to 3-14
SEtP	Percentage calibration	4-5
OSEt	Zero shift calibration	4-6

* Refer to the following 2 pages for details.

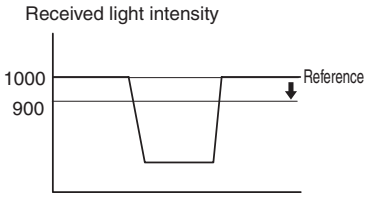
Percentage calibration

SEt SEtP

The setting value can be specified as a percentage in respect to the current received light intensity.

The percentage calibration target value can be set in the range of "-99P" (-99%) to 99P (99%)
Default: -10P (-10%)

Setting example When the percentage calibration target value is set to "-10%".



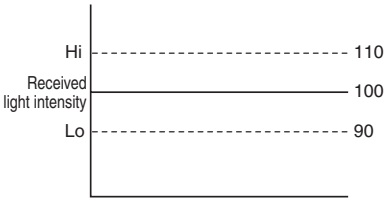
■ Sensitivity setting

1 **In the desired reference state, press the [SET] button.**
Calibration is complete after the setting value flashes momentarily, and then stops (lights up).

Reference

- If the external input setting is set to "SEt" (external calibration input), periodic percentage calibration is possible from external devices, enabling stable detection even on workpieces having small sensitivity differences.
  "External Input" (page 4-17)
- If the detection mode is set to "ArEA (area detection mode)", Hi and Lo are set simultaneously according to the received light intensity.

(Example)
If the percentage calibration is set to 10P (10%) when the reference received light intensity is "100", the Hi and Lo setting values will be set as follows.
Hi setting value: 110
Lo setting value: 90



Zero shift calibration

SEt | 0SEt

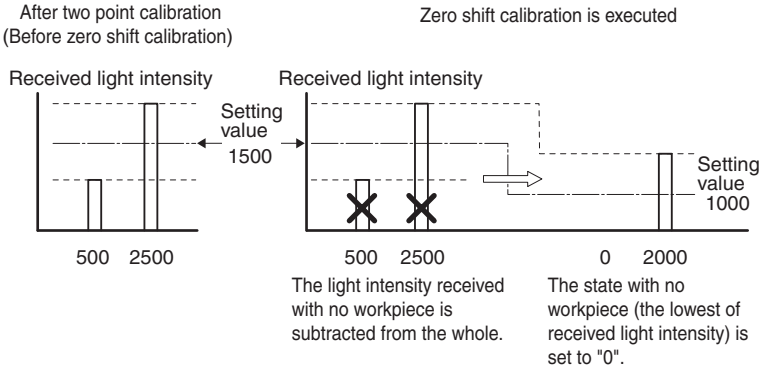
This sensitivity setting performs the zero shift function and basic calibration (two-point calibration / maximum sensitivity calibration / full auto calibration) simultaneously.
The lower of the received light intensity values specified at the time of sensitivity setting will automatically be set to "0".

Reference The light intensity received with a workpiece present will be applied with the same amount of correction as for that received with no workpiece.

The following basic calibrations can be set while in the zero shift calibration.

- Two-point calibration
- Maximum sensitivity calibration
- Full auto calibration

Setting example If two-point calibration is performed with a reflective model when the light intensity received with a workpiece is "2500" and without a workpiece is "500":

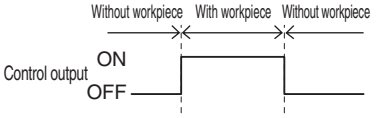
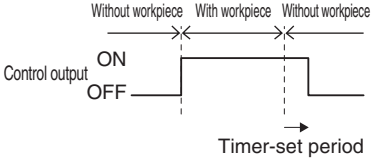
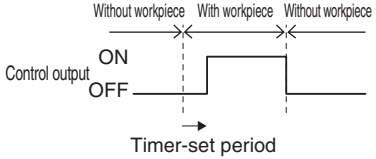
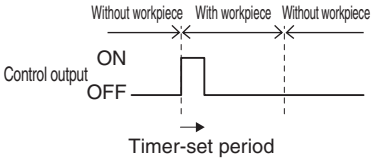

After two point calibration
(Before zero shift calibration)
Zero shift calibration is executed
Received light intensity
Setting value 1500
Received light intensity
Setting value 1000
500 2500
500 2500
0 2000
The light intensity received with no workpiece is subtracted from the whole.
The state with no workpiece (the lowest of received light intensity) is set to "0".

Output Timer

toFF ----

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

There are 3 types of timers available.

Display	Function	Timing chart*
toFF	Uses no output timer. (Default)	
oFFd	Off-delay timer Turns off the output at a specified time after the detection signal goes off. Setting range: 1 to 9999 ms Default: 10 ms	
on-d	On-delay timer Turns on the output at a specified time after the detection signal goes on. Useful if the ON duration is limited because the workpiece is shaky such as by vibration. Setting range: 1 to 9999 ms Default: 10 ms	
Shot	One-shot timer Turns on the output and keeps it on for a specified period after the detection signal goes on. Setting range: 1 to 9999 ms Default: 10 ms	

* Example of the light-ON (L-on) mode for the reflective model and the dark-ON (d-on) mode for the thrubeam model.

Reference The timer can only control on/off switching of the sensor output.

Detection Mode

dEtc Std

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

The table below lists the detection modes that can be selected.

Display	Detection mode	Function	Reference page
Std	Normal detection	Normal detection mode (Default)	-
dtn1	DATUM1 mode*	The received light intensity when there is no workpiece is always calibrated to "100.0", and the setting value is also calibrated so that the setting value and received light intensity ratio is always constant.	4-9
dtn2	DATUM2 mode*	The received light intensity when there is no workpiece is always calibrated to ".0", and the setting value is also calibrated so that the setting value and received light intensity ratio is always constant.	4-11
ArEA	Area detection mode	Detection is made only when the received light intensity goes out of a given range.	4-14
_r-d	Rising edge detection mode	Detection is made only when the received light intensity increases.	4-16
-L_d	Falling edge detection mode	Detection is made only when the received light intensity decreases.	4-16

* In the DATUM mode, correction intervals can be set in the range of LEu1 to LEu3. The default is LEu1.
Also, the warning level can be set in the range of 0P (0%) to 100P (100%). The default is 50P.

"Adjusting the correction interval" (page 4-12)

"Changing the warning level" (page 4-13)

Point

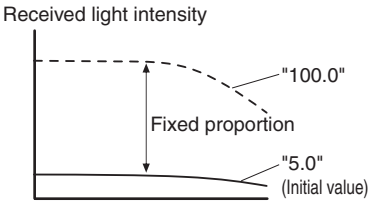
Refer to "Restrictions on Each Detection Mode" (page 6-7) for restrictions on the sensitivity setting methods.

DATUM1 mode

dEtc dtn 1

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

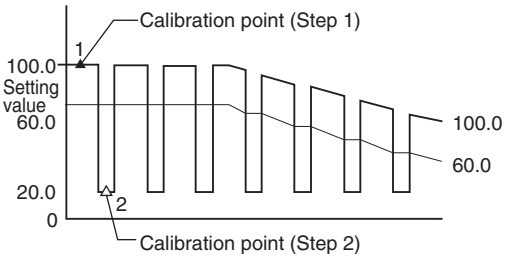
In DATUM1 mode, the light intensity received without a workpiece is always corrected to "100.0". The setting value is also corrected according to the correction amount, so that the ratio of setting value and received light intensity is kept constant, with the result of stable detection. The display of the setting value does not change.



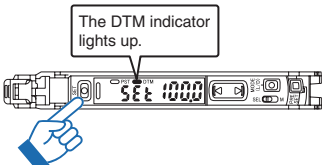
The DATUM mode is effective in environments where received light intensity varies gradually, for example where the sensor head is prone to contamination or large temperature changes.

■ Sensitivity setting in DATUM1 mode

The sensitivity setting procedure below is an example of two-point calibration (where the received light intensity is "100.0" when a workpiece is absent and "20.0" when a workpiece is present) using the thrubeam model.

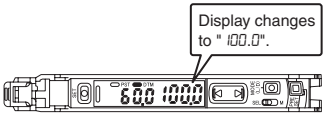


1 **Press the [SET] button with no workpiece present.**



2 **Press the [SET] button with a workpiece present.**

The light intensity received in full-light receiving state is displayed as " 100.0".



Point

- **When the received light intensity stays lower than a given warning level, the received light intensity correction stops and the DTM indicator flashes.**

  "Changing the warning level" (page 4-13)
- **The light intensity correction stops if the raw received light intensity drops below 50 (200 when the light intensity expansion setting is set to FuLL). You can check the raw received light intensity by using the extension display in the sub display, or by pressing and holding the [MODE] button on the Basic screen for 3 seconds or longer.**

  "Display Gain" (page 4-28)

  "Sub Display" (page 4-20)

Reference

- By pressing the [PRESET] button, the current value (received light intensity) can be forcibly calibrated to " 100.0". Calibration is completed when the current value stops flashing. (At this time, the setting value is internally calibrated so that the received light intensity and setting value ratio stay constant.)

- You can also set the interval for executing correction, and/or the level of the received light intensity change for the warning status.

  "Adjusting the correction interval" (page 4-12)

  "Changing the warning level" (page 4-13)
- The saturation level is fixed to 101P (101%). To display a value higher than 100.0, turn the preset saturation function OFF.

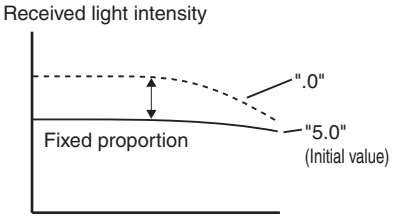
  "Preset Saturation Function" (page 4-25)

DATUM2 mode

dEtc | dtn2

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

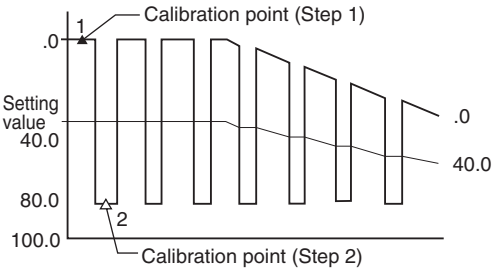
In DATUM2 mode, the light intensity received without a workpiece is always corrected to ".0". The setting value is also corrected according to the correction amount, so that the ratio of setting value and received light intensity is kept constant, with the result of stable detection. The display of the setting value does not change.



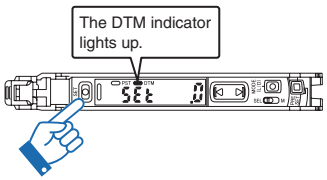
The DATUM mode is effective in environments where received light intensity varies gradually, for example where the sensor head is prone to contamination or large temperature changes.

■ Sensitivity setting in DATUM2 mode

The sensitivity setting procedure below is an example of two-point calibration (where the received light intensity is ".0" when a workpiece is absent and "80.0" when a workpiece is present) using the thrubeam model.

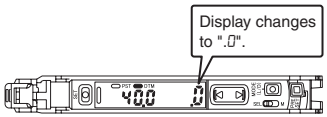


1 **Press the [SET] button with no workpiece present.**



2 **Press the [SET] button with a workpiece present.**

The light intensity received in the full-light receiving state is displayed as ".0".



Point

- **When the received light intensity stays higher than a given warning level, the received light intensity correction stops and the DTM indicator flashes.**

  "Changing the warning level" (page 4-13)
- **The light intensity correction stops if the raw received light intensity drops below 50 (200 when the light intensity expansion setting is set to FuLL). You can check the raw received light intensity by using the extension display in the sub display, or by pressing and holding the [MODE] button on the Basic screen for 3 seconds or longer.**

  "Display Gain" (page 4-28)

  "Sub Display" (page 4-20)

Reference

- By pressing the [PRESET] button, the current value (received light intensity) can be forcibly calibrated to "0". Calibration is completed when the current value stops flashing. (At this time, the setting value is internally calibrated so that the received light intensity and setting value ratio stay constant.)

- You can also set the interval for executing correction, and/or the level of the received light intensity change for the warning status.

  "Adjusting the correction interval" (page 4-12)

  "Changing the warning level" (page 4-13)

■ Adjusting the correction interval

dAtA LEv1

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

A desired correction interval can be selected from the 3 levels:

Power mode	LEv1 (LEVEL1)	LEv2 (LEVEL2)	LEv3 (LEVEL3)
TURBO/SUPER/ULTRA/MEGA	26 s	3.3 s	205 s

Reference LEv1 (LEVEL1) is recommended.

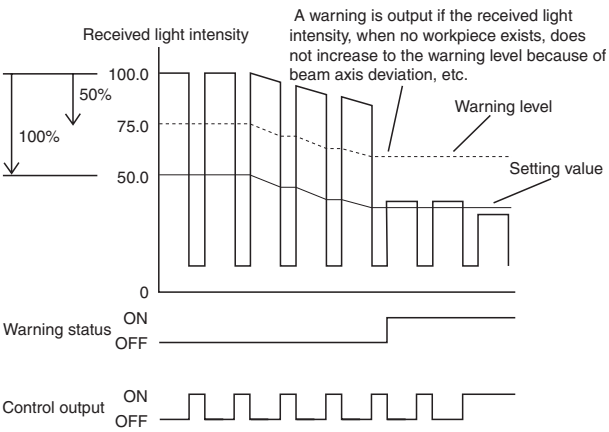
■ Changing the warning level

rt 10 50P

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

A warning is output when the amplifier detects variation of the received light intensity in the range where the output does not turn on.
When the received light intensity stays between the warning level and set value, the received light intensity calibration stops, the DTM indicator flashes, and a warning is output.

Display example When the warning level is set to 50%, dtm1, D-on:



The warning level can be set in the range of 0P (0%) to 100P (100%).
(Default: 50P (50%)).

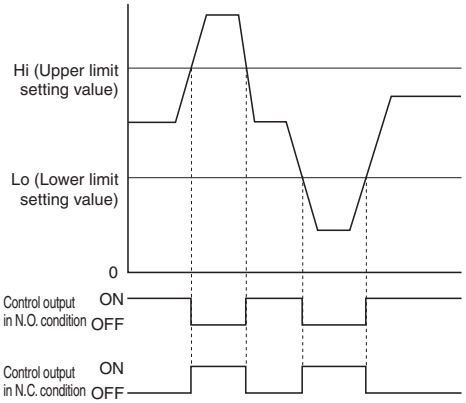
- 100P (100%) : A warning is not output even if the received light intensity changes.
- 50P (50%) : A warning is output if the received light intensity drops to the middle between the received light intensity when no workpiece is present and the setting value.
- 0P (0%) : A warning is output if the received light intensity drops even slightly.

Area detection mode

dEtc ArEA

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

In this mode, the output signal is delivered (in N.O. condition) if the received light intensity is in the area defined by Hi (upper limit) and Lo (lower limit).



Reference Output-1 can be configured to be ON (N.O.) or OFF (N.C.) when the received light intensity is above the Lo and under the Hi settings.

"Output Switch (L-on/D-on)" (page 3-4)

Point **Always ensure that "upper limit setting value > lower limit setting value". If "upper limit setting value ≤ lower limit setting value", the received light intensity will always be output outside the Hi and Lo range.**

■ Methods for setting upper and lower limits

The upper and lower limits can be set using one of the 2 methods:

● Setting sensitivity using the percentage calibration mode

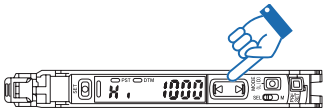
See 📖 "Percentage calibration" (page 4-5).

●Sensitivity setting using other calibration modes

Sensitivity is set separately for Hi and Lo.

1 **Press [MODE] to display "H ı" or "Lo".**

The "H ı" or "Lo" value, and the current setting values are displayed alternately.
When the [MODE] button is pressed while the display alternately flashes, the "H ı" or "Lo" display changes.
If you do nothing for 3 seconds or more, the received light intensity display is automatically restored.



2 **Press the [SET] button to perform sensitivity setting (two-point calibration, maximum sensitivity setting, or other).**

Calibration is complete after the setting value flashes momentarily, and then stops (lights up).

Edge detection mode

dEtc _r d | dEtc f_d

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

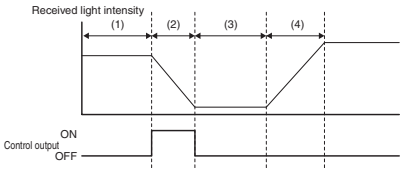
In the edge detection mode, the sensor amplifier detects changes of received light intensity over a fixed period.
This mode is used to turn on the output only when a workpiece is moving into or out of the detection range of the sensor head.

- To turn the output ON when the received light intensity drops:
  Select "f_d" (Falling edge detection mode)
- To turn the output ON when the received light intensity increases:
  Select "_rd" (Rising edge detection mode)

■ Timing chart

Operation example When the falling edge detection mode is selected with a thrubeam model:

(1), (3): The output is OFF because the received light intensity is not changing.
(2) : The output is ON because the received light intensity is decreasing.
(4) : The output remains OFF because the received light intensity is changing but is increasing.



Point

- **Combining the edge detection mode and any of the functions below makes it more difficult to detect gradual changes in light intensity.**
- **If the interference prevention is "dobL" (double):**
  "Interference Prevention" (page 4-29)
- **If the eco mode is "FuLL" (Full):**
  "Power Save" (page 4-27)

■ Sensitivity setting

1 Press the [SET] button with no workpiece present.

The amplifier is now configured to ignore changes in received light intensity for the duration that the [SET] button is pressed.
Calibration is complete after the setting value flashes momentarily, and then stops (lights up).

Reference

- When detecting workpieces running on a conveyor, the [SET] button can be pressed for a longer period to ignore the fluctuations of received light intensity due to conveyor vibration.
- If the setting value is so low that objects other than the workpiece of interest are also detected, fine adjustments can be made with the ◁ ▷ button.

External Input

in oFF

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

On sensor amplifiers with an external input option (PS-N11□/N11C□/ N12C□), the external input line can be controlled to utilize the following functions:

Display	Function
oFF	Disables use of the external input function. (Default)
SEt	**External calibration input** Uses the external input to perform calibration.
PrSt*1	**Preset input** Executes a preset at the rising edge of the external input. 📖 "Preset Function" (page 3-6)
ShFt*2	**Zero shift input** Executes a zero shift at the rising edge of the external input. 📖 "Setting the Current Received Light Intensity to 0 (Zero Shift)" (page 3-16)
rSt	**Reset input** Resets the display at the rising edge of the external input when performing limit detection in the NU series or while using the hold function. 📖 "Light intensity hold display" (page 4-22) 📖 "Excess gain hold (%) display" (page 4-24) 📖 "Limit detection (exclusive to the NU series)" (page 4-31)
LoFF	**Transmission OFF input** Stops transmission during signal input.
PAUS	**Pause mode transition input** Locks the output condition during external input. 📖 "Pause mode transition input" (page 4-18)
SLEP	**Sleep mode transition input** Uses the power save mode during external input. 📖 "Sleep mode transition input" (page 4-19)

*1 When the preset input is selected, the zero shift function is disabled and cannot be set.
*2 When the zero shift input is selected, each preset function is disabled and cannot be set.

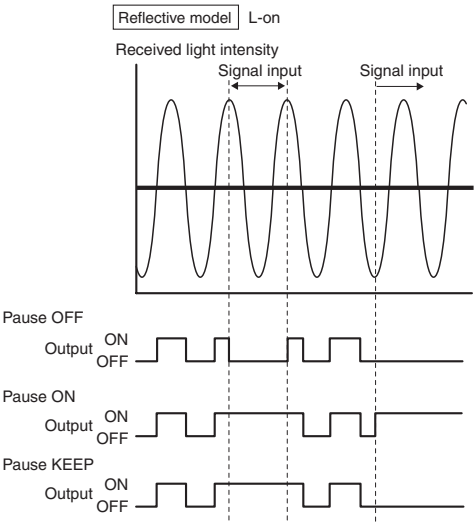
Reference
- For external input cabling, see 📖 "Wiring Diagrams for Sensor Amplifiers" (page 2-4).
- Provide a short-circuit time of 2 ms or more, and 25 ms or more when external calibration input is selected.

Pause mode transition input

in PAUS

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

During signal input, the output can be locked in a desired state regardless of received light input. There are 3 selections of output status that can be locked with the pause function.



Display	Function
oFF	The output is locked in OFF state during signal input. (Default)
on	The output is locked in ON state during signal input.
KEEP	The output is locked in its existing state when a signal is received from the external input.

Sleep mode transition input

in SLEP

Refer to page 4-2 "Detection Settings (Func)" for setting methods.

This function holds the sensor amplifier in the power save state (sleep mode) during input of the external signal.
Once the sleep mode is entered, the following events occur.

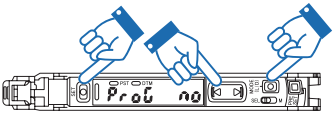
- The display of received light intensity and setting value goes out.
- Light transmission stops.
- The output is turned off (for both L-on and D-on)
- A single segment on the digital display pulses across the display.

The normal display is restored after any key is pressed.
If no operation is made for the next 4 seconds, the display unit turns back off.

Parameter Save

If "SEt" (external calibration input), "PrSt" (preset input) or "ShFt" (zero shift input) is selected as an external input and the "Parameter Save by Ext-Input" option is set to "no", the settings changed with external input will not be written to the EEPROM.
This prevents frequent writing to the EEPROM when inputting external signals and thus prevents the EEPROM from reaching the end of its service life (approx. 1 million writes).

1 **When received light intensity is displayed, press and hold the [MODE], [SET], and ◁ buttons simultaneously for 3 seconds or more.**



To enable the restriction of writing settings, use the ◁▷ button to select "no".

2 **Press and hold the [MODE] button.**

The current received light intensity is displayed.

Reference

- When "no" is set, the values changed with external inputs will not be changed even after the power is turned off and on.
- When "YES" (default) is set, the settings are written to the EEPROM approx. 3 seconds after the settings are changed with external inputs.

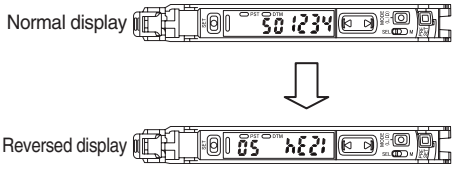
4-4 Display Settings (diSP)

Display Reverse

rEv oFF

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

The current value and setting value displays can be inverted.



Display	Function
oFF(OFF)	Normal display (Default)
on(ON)	Reversed display

Sub Display

Sub oFF

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

In addition to the received light intensity and setting value, the following information can be displayed on the sub display.

Display	Information	Operation buttons		Reference page
		[SET]		
oFF(OFF)	No sub display (Setting value / received light intensity) (Default)	Yes	Yes	-
StdE (Extension)*2	Extension display (Displaying up to 5 digits)	No*1	No	4-21
bAr(Bar)*6	Bar display (Bar excess gain / received light intensity)	Yes	Yes	4-21
PEr(Percent)*6	Excess gain(%) display (Bar excess gain / excess gain)	Yes	Yes	4-22
HLd(Hold)*3	Received-light intensity hold display (5 types selectable)	Yes	No	4-22
HLdP (Percent Hold)*4*6	Excess gain hold(%) display (5 types selectable)	Yes	No	4-24
Ldon(L-on/D-on)	L-on/d-on display (no/nC display)*5	Yes	No	4-24

Yes: Operation is possible. No: Operation is not possible.

*1 For external calibration, the [SET] button can be operated to set values up to "9999".

*2 The displayed value is that before each preset function or zero shift function is executed.

*3 If the detection mode is set to DATUM1 mode or DATUM2 mode, the value before DATUM correction is displayed.

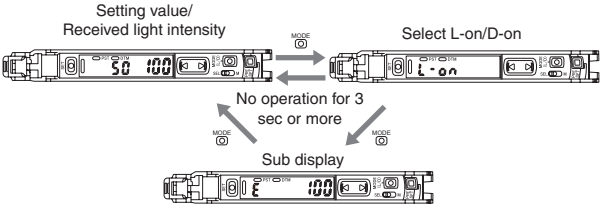
*4 If the detection mode is set to DATUM1 mode or DATUM2 mode, the excess gain hold display cannot be selected.

*5 If the detection mode is set to the area detection mode, rising edge detection mode, or falling edge detection mode, no/nC is displayed.

*6 When set to the edge detection mode, bar display, excess gain display, and excess gain hold display cannot be selected.

■ **Displaying a sub display**

After selecting the desired sub-screen display, press the [MODE] button twice in the normal display state (setting value / received light intensity).
Press the [MODE] button once again to return to the normal display.



Extension display

SubStdE

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

The received light intensity usually displayed with 4 digits can be extended to a 5-digit display.
The maximum received light intensity value which can be displayed differs according to the power mode and display gain. Refer to "Display Gain" (page 4-28) for more details.

Reference

- The upper limit of the setting value remains a 4-digit value (9999). A larger value cannot be set.
- Each preset function, zero shift function, and each calibration function cannot be used during the extension display.
- The received light intensity calibrated with each preset function, zero shift function, each DATUM mode or edge detection mode is not applied on the extended display.

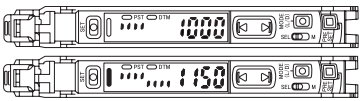
Bar display

SubbAr

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

Received light intensity can be displayed as a bar graph.
Bars are displayed in real time in the range of 85% to 115% at intervals of 5%, where 100% is the setting value.
Up to 8 bars are displayed.

Display example If the setting value is 1000:



Excess gain (%) display

Sub PEr

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

Received light intensity is displayed as an excess gain* relative to the setting value. On the screen, the received light intensity is displayed as a bar graph and a percentage number.

* Excess gain = (Received light intensity/Setting value) x 100

Display example If the setting value is 1000 and the received light intensity is 2000 (200%):

Light intensity hold display

Sub HLd

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

The maximum peak values, and the minimum bottom values, of received light intensity can be displayed continuously. You can select from 5 possible display combinations:

Display	Displayed values
Std (Standard)	Updates the peak or bottom value each time the current received light intensity falls below or rises above, respectively, the setting value. (Default)
P-P_ (Peak Max/Peak Min)	Displays the maximum and minimum of peak values since the power is turned on. (Cumulative)
b-b_ (Bottom Max/Bottom Min)	Displays the maximum and minimum of bottom values since the power is turned on. (Cumulative)
P_b- (Peak Min/Bottom Max)	Displays the minimum of peak values and the maximum of bottom values since the power is turned on. (Cumulative)
P-b_ (Peak Max/Bottom Min)	Displays the maximum of peak values and the minimum of bottom values since the power is turned on. (Cumulative)

■ How to reset the held values

To reset the peak and/or bottom values that are currently held, use one of the following procedures:

- Press and hold the [MODE] and [SET] buttons simultaneously.
- Set the external input (in) to "reset input (rSt)" and short-circuit the pink wire (pin (2)). "External Input" (page 4-17)
- Turn off the power.

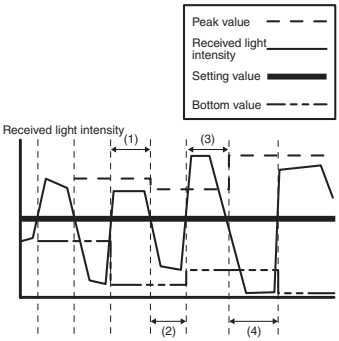
■ **Timing chart for standard setting (Std)**

[Peak value]

- Samples while the current received light intensity > setting value ((1), (3), etc.).
- If the current received light intensity is lower than the setting value, the previous peak value is updated.

[Bottom value]

- Samples while the current received light intensity < setting value ((2), (4), etc.).
- If the current received light intensity is higher than the setting value, the previous bottom value is updated.



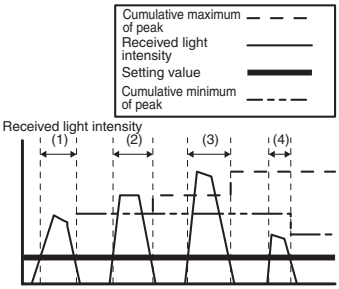
■ **Timing chart for peak value**

[Cumulative maximum peak value]

- Samples while the current received light intensity > setting value ((1) to (4)).
- If the current received light intensity is lower than the setting value, the previous peak value and current peak value are compared. If the current peak value is higher, the value is updated.

[Cumulative minimum peak value]

- Samples while the current received light intensity > setting value ((1) to (4)).
- If the current received light intensity is lower than the setting value, the previous peak value and current peak value are compared. If the current peak value is lower, the value is updated.



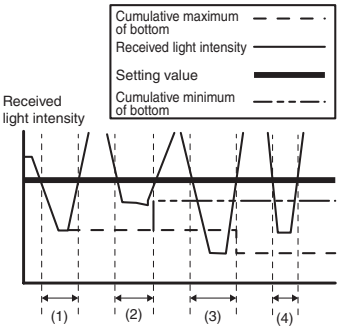
■ **Timing chart for bottom value**

[Cumulative maximum bottom value]

- Samples while the current received light intensity < setting value ((1) to (4)).
- If the current received light intensity is higher than the setting value, the previous bottom value and current bottom value are compared. If the current bottom value is higher, the value is updated.

[Cumulative minimum bottom value]

- Samples while the current received light intensity < setting value ((1) to (4)).
- If the current received light intensity is higher than the setting value, the previous bottom value and current bottom value are compared. If the current bottom value is lower, the value is updated.



Excess gain hold (%) display

SubHLdP

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

This function is the same as the "received-light intensity hold display", except that the value being held is displayed as excess gain instead of received light intensity.

"Excess gain (%) display" (page 4-22)
"Light intensity hold display" (page 4-22)

L-on / D-on display

SEtStd

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

The current output condition (L-on or D-on) can be displayed when the setting value is displayed. The received light intensity is displayed in terms of received light intensity as usual.

If the detection mode is set to the area detection mode, rising edge detection mode, or falling edge detection mode, noo/nC is displayed.

Preset Saturation Function

Pr-H on

Refer to page 4-2 "Display Settings (diSP)" for setting methods.

The saturation level can be set in the range of 100P (100%) to 200P (200%) when the preset saturation function is ON.
For example, if this function is set to 150P, the received light intensity will be corrected to " 150.0" when the preset function is enabled, and the digital display will display " 100.0".
The saturation level can be set to a higher value for stable detection even in environments which are prone to some contamination, such as dust.
Turn off this function if you want to display values above " 100.0" in applications where the preset function or the DATUM1 mode is used.

Display	Function
on (ON)	Fixes the display to " 100.0" (displays no value higher than " 100.0") when the actual received light intensity is above 100.0. (Default: 110P)
oFF (OFF)	Displays the actual received light intensity as is, even when it is above " 100.0".

Point **Setting too high of a saturation level (specifying too large a value) decreases the detectability for small differences in light intensity or transparent workpieces.**

*1 When the detection mode is set to DATUM1, the preset saturation function ON/OFF state can be selected, but the saturation level will be fixed to 101P (101%), and the setting screen will not appear.
*2 When the detection mode is set to DATUM2, the preset saturation function setting screen will not appear.

Reference
- Refer to "Adjusting the Sensitivity" (page 3-5) for execution of preset.
- Refer to the next page for the detailed operating principle.

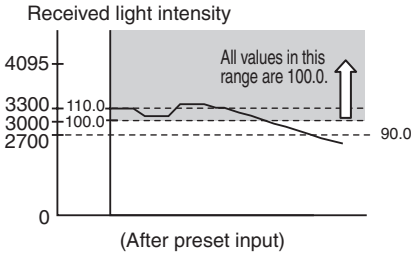
Operating principles of the preset function

(Current received light intensity is 3300 in this example.)

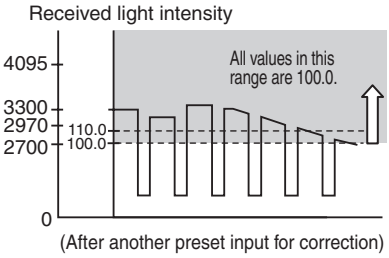
Preset input is used to register the light intensity as "100.0".
The actual received light intensity (3300) is set to "110%" and all actual received light intensities exceeding "100%" are displayed as " 100.0".

When light intensity falls below 100%, a value lower than " 100.0" is displayed.
(The percentage value 110% (i.e., the saturation level) at the time of registration can be any value between 100 and 200%.)

"Preset Saturation Function" (page 4-25)



If the displayed light intensity falls below "100.0", the preset input can be performed again to restore stable detection.
If light intensity is not displayed as " 100.0" after preset input, the sensor amplifier is not in stable detection condition.



Reference Even when the maximum sensitivity preset function or full auto preset function is used, the preset saturation level setting function operates based on the " 100.0" point.

Power Save

Eco oFF

Refer to page 4-2 "System Settings (SYS)" for setting methods.

Power consumption can be reduced by turning off the digital display and output indicators.

Display		Function
oFF (OFF)		Disables the power save function. (Default)
on (ON)		Enables the power save function. (A single segment pulses across the digital display.)
FuLL (FULL)		Reduces power consumption. (The power save function is ON, and response time is 4 times longer.)
	ALL (ALL)	Eco ALL (The digital display and output indicators are all off). This item becomes selectable by pressing and holding while FuLL is lit. The power consumption in Eco ALL is the same as that in Eco ON.

Immediately after the ON or FULL option is selected, the option is enabled, and the power save display results.
The normal display is restored after any key is operated (except for eco ALL).
If no operation is made for the next 30 seconds, the power save display returns.

Point

When FuLL is selected, response time is 4 times as long as usual (i.e., as compared to when oFF or on is selected).
When ALL is selected, response time is the same as usual.

■ Deactivating eco ALL

1 **Press and hold the [MODE] and [PRESET] buttons simultaneously.**

The screen returns to the display of current received light intensity.
If no operation is made for the next 30 seconds, the eco ALL state is restored.

Display Gain

GA in | Std

Refer to page 4-2 "System Settings (SYS)" for setting methods.

Received light intensity can be increased 4 times without sacrificing response time.

Display	Function
Std (Standard)	Normal light intensity display (Default)
FuLL (Full)	Full light intensity display (Hysteresis increases 4 times)

The maximum received light intensity value which can be displayed differs according to the power mode setting and display screen.
The maximum received light intensity values which can be displayed are shown below.

Display screen	Display gain	TURBO	SUPER	ULTRA	MEGA
Normal display	Std	4095	8190	9999	9999
	FuLL	9999	9999	9999	9999
StdE (Extension display)	Std	4095	8190	32760	65504
	FuLL	16380	32760	65504	65408

"Power Modes" (page 4-4)
"Extension display" (page 4-21)

Point **When the preset function is used in DATUM1 or DATUM2 mode, correctible values are limited to 200.**

Interference Prevention

intF Std

Refer to page 4-2 "System Settings (SYS)" for setting methods.

Malfunction may result from "interference", a phenomenon in which light transmission occurs simultaneously with any other sensor amplifier.
However, when the number of sensor amplifiers increases, the light transmission timing automatically shifts and prevents this interference.
Setting this function to "dobL" (Double) on all of the connected amplifier units doubles the number units that do not mutually interfere.

Display	Function
Std (Standard)	Normal operation (Default)
dobL (Double)	The interference prevention doubles over the Standard state.

Point

- **Selecting "dobL" also doubles response time over the Std state.**
- **When selecting "dobL", the main unit and its connected expansion units must all be set to "dobL".**
- **This function does not work if the eco function is set to "FuLL"(Full).**

Reference

- If the number of interference prevention units is set to Std, the number of units that do not interfere when the PS-N10 Series main unit and expansion units connected will be 4 units. If set to dobL, the number of units that do not interfere will be doubled (8 units).
- Consult with KEYENCE for the interference prevention when using the PS-N10 Series together with other series.

Common Key-Operations Function

LinK oFF

Refer to page 4-2 "System Settings (SYS)" for setting methods.

Some operations on the main unit are applied equally and simultaneously to all expansion units connected to it.

Display	Function
oFF (OFF)	Disables common key operations. (Default)
on (ON)	Enables common key operations.

The operations that can be applied to all expansion units are as follows:

- Enabling/disabling the preset function
  "Preset Function" (page 3-6)
- Enabling/disabling the zero shift function
  "Zero Shift Function" (page 3-16)
- Enabling/Disabling the key lock function
  "Key Lock" (page 3-22)

Reference This function is effective only with the main unit to which expansion units are connected. This function cannot be used with an independent main unit or with the expansion units.

Long-Distance Detection Mode

LonG oFF

Refer to page 4-2 "System Settings (SYS)" for setting methods.

If the long-distance detection mode is set to on, the received light intensity increases, and the detection distance in each power mode becomes greater.

Display	Function
oFF (OFF)	Disable long-distance detection mode (Default)
on (ON)	Enable long-distance detection mode

Point **The PS-47(C), PS-48, PS-49(C), PS-58 and PS-206 do not support long-distance detection mode. Do not select long-distance detection mode when using these sensor heads.**

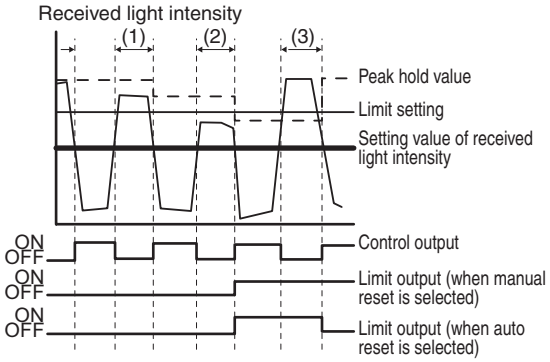
Limit detection (exclusive to the NU series)

With the NU series communication units, you can load the ON/OFF status for the warning (limit output) when the received light intensity is low. When the cumulative minimum value of the received light intensity's peak value falls below the set limit value, it is recognized as low received light intensity, and the limit output turns ON.

"Light intensity hold display" (page 4-22)

■ Timing chart

The peak value in period (1) is above the set limit value, thus the limit output remains OFF. The peak value in period (2) has fallen below the set limit value, so the limit output turns ON. The peak value in period (3) has risen above the set limit value again, so the limit output turns OFF when auto reset is selected. When manual reset is selected, the limit output remains ON because the cumulative minimum value is equal to the peak value in period (2), which is less than the set limit value.



■ How to reset after the output is activated

Resetting method
Manual reset - Execute reset using external input. - Cycle the power.
Auto reset - Execute reset using external input. - Cycle the power. - When "peak value > setting value + hysteresis"

Custom Save (Settings Save)

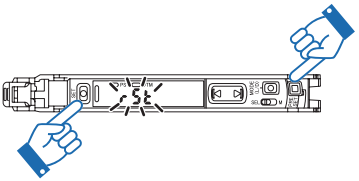
The current setting value and advanced function settings can be saved in the sensor amplifier.

"Settings for Advanced Functions" (page 4-1)

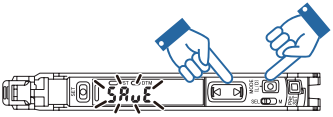
Point **Executing a custom save will override the previously saved settings with the current settings.**

1 **Press and hold the [SET] and [PRE-SET] buttons simultaneously for 3 seconds or more.**

The "rSt" display flashes.

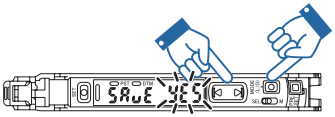


2 **Press the button to display "SAvE", and then press the [MODE] button**



3 **Press the button to display "YES", and then press the [MODE] button.**

After the settings are saved, the screen displays "oE", which is then replaced with the current received light intensity.



User Reset (Settings Recall)

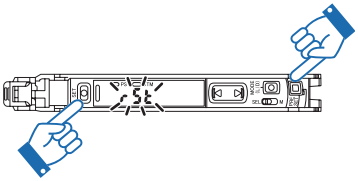
The settings saved with the custom save function can be recalled.

Point **Executing a user reset will override all of the previous settings with the settings that were saved using the custom save function.**

Reference The factory settings will be recalled if a user reset is executed without previously executing a custom save.

1 **Press and hold the [SET] and [PRESET] buttons simultaneously for 3 seconds or more.**

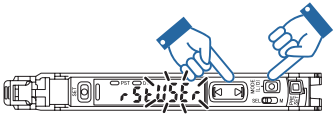
The "rSt" display flashes.



2 **Press the [MODE] button.**

3 **Press the ◁▷ button to display "USEr", and then press the [MODE] button.**

After a user reset is executed, the screen displays "oE", which is then replaced with the current received light intensity.



MEMO

Specifications

5

This chapter provides the specifications, circuit diagrams and dimensions of the PS-N10 Series.

5-1 Specifications 5-2
5-2 Circuit Diagrams 5-4
5-3 Dimensions 5-5

Sensor Head

■ Transparent Sensor Heads

Type		Thru-beam type						
		General-purpose					Environmentally resistant type	
		Long distance	Adjustable axis	Cylinder	Flat		Long distance	Built-in groove
Model *1		PS-55(C)	PS-05	PS-58	PS-52(C)	PS-56	PS-201(C)	PS-202
Detection distance *2 (mm)	MEGA	3600 (6000)	3600 (6000)	1000	1200 (1500)	750 (900)	3600 (6000)	900 (1000)
	ULTRA	2800 (5000)	2800 (5000)	900	800 (1000)	500 (600)	2800 (5000)	700 (900)
	SUPER	2200 (4200)	2200 (4200)	750	400 (650)	400 (450)	2200 (4200)	600 (800)
	TURBO	2000 (4000)	2000 (4000)	700	300 (600)	300 (400)	2000 (4000)	500 (750)
Smallest detectable object *3		ϕ 1 mm opaque		ϕ 0.5 mm opaque	ϕ 0.3 mm opaque	ϕ 0.3 mm opaque	ϕ 0.8 mm opaque	ϕ 0.5 mm opaque
Light source		Infrared LED						
LED Class		Class 1 LED Product (IEC60825-1)						
Environmental resistance	Protection structure	IP64		IP67	-		IP67	
	Operating ambient temperature	-10ºC to +60ºC (no freezing)						
	Operating ambient luminance	Incandescent lamp: 4,000 lx or less; sunlight: 12,000 lx or less						
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours for each axis (X, Y, and Z)						
Weight (2 m cable included)		Approx. 30 g	Approx. 30 g	Approx. 30 g	Approx. 30 g	Approx. 30 g	Approx. 40 g	Approx. 40 g

*1 A sensor head connector is attached to the end of the cable for the sensor heads with model names containing the suffix C.
*2 The values in parentheses indicate the detection distance when long-distance detection mode is enabled and a 5 m sensor head cable is used.
*3 The size of a workpiece that can be detected at the maximum detection distance.

■ Reflective Sensor Heads

Type		Diffuse reflective type					Limited reflective type	
		General-purpose			Environmentally resistant		General-purpose	
		Long distance	Flat	Cylinder	Long distance	Narrow vision	Small spot	Long distance
Model *1		PS-45	PS-46	PS-48	PS-205	PS-206	PS-47(C)	PS-49(C)
Detection distance *2 (mm)	MEGA	600 (900)	200 (250)	75	600 (900)	250	10±4	32 to 53
	ULTRA	400 (600)	150 (200)	45	400 (600)	180		
	SUPER	250 (450)	120 (160)	30	250 (450)	100		
	TURBO	200 (400)	100 (140)	25	200 (400)	70		
Smallest detectable object *3		-	-	-	-	-	ϕ 0.03 mm copper wire	ϕ 0.1 mm copper wire
Spot diameter		-	-	-	-	ϕ 6 mm when the detection distance is 70 mm	ϕ 8 mm when the detection distance is 10 mm	ϕ 1.5 mm when the detection distance is 50 mm
Light source		Infrared LED				Red LED		
LED Class		Class 1 LED Product (IEC60825-1)						
Environmental resistance	Protection structure	IP64	-	IP67			-	
	Operating ambient temperature	-10ºC to +60ºC (no freezing)						-10ºC to +50ºC (no freezing)
	Operating ambient luminance	Incandescent lamp: 4,000 lx or less; sunlight: 12,000 lx or less					Incandescent lamp: 4,000 lx or less; sunlight: 5,000 lx or less	
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours for each axis (X, Y, and Z)						
Weight (2 m cable included)		Approx. 30 g	Approx. 30 g	Approx. 40 g	Approx. 60 g	Approx. 60 g	Approx. 30 g	Approx. 30 g

*1 There is a sensor head connector attached to the end of the cable for the sensor heads with model names containing the suffix C.
*2 The values in parentheses indicate the detection distance when long-distance detection mode is enabled.
*3 The values obtained by optimizing the detection distance and sensitivity.

Sensor Amplifier

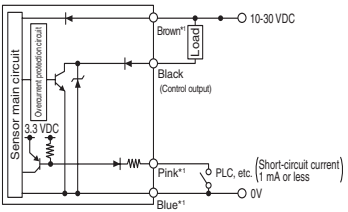
Cable / Connector		Cable		M8 Connector		0-line
Main unit / Expansion unit		Main unit	Expansion unit	Main unit	Expansion unit	Expansion unit
Model	NPN	PS-N11N	PS-N12N	PS-N11CN	PS-N12CN	PS-N10
	PNP	PS-N11P	PS-N12P	PS-N11CP	PS-N12CP	
Control output		1 output	1 output	1 output	1 output	N/A [*1]
External input		1 input	N/A	1 input	1 input	N/A
Response time		500 μs (TURBO)/1 ms (SUPER)/4 ms (ULTRA)/16 ms (MEGA)				
Output operation		Light-ON/Dark-ON				
Timer function		Timer OFF, OFF delay, ON delay, One-shot Timer variable (1 ms to 9999 ms) Maximum error to setting value is ±10 % or less				
Control output	NPN output	NPN open collector 30 V, Max: 100 mA or less (for standalone operation)/20 mA or less (for expansion) Residual voltage 1 V or less (Output current: 10 mA or less)/2 V or less (Output current: 10 to 100 mA)				
	PNP output	PNP open collector 30 V, Max: 100 mA or less (standalone operation)/20 mA or less (for expansion) Residual voltage 1.2 V or less (Output current: 10 mA or less)/2.2 V or less (Output current: 10 to 100 mA)				
External input		No-voltage input (with/without contact), Input time 2 ms (ON)/20 ms (OFF) or more [*2]				
Expansion units		Up to 16 units (a total of 17 units connected)				
Protection circuit		Protection against reverse power connection, output overcurrent, output surge, and output wiring error				
Number of interference prevention units		TURBO/SUPER/ULTRA/MEGA: 4 (These numbers double when "Double" is selected.)				
Rated	Power voltage [*4]	24 VDC (operating voltage 10-30 VDC (including ripple)), ripple (P-P) 10 % or less, Class 2 or LPS [*6]				
	NPN [*5]	Normal: 810 mW or less (at 30 V. 28 mA or less at 24 V, 34 mA or less at 12 V) Eco on: 700 mW or less (at 30 V. 24 mA or less at 24 V, 27 mA or less at 12 V) Eco full: 490 mW or less (at 30 V. 17 mA or less at 24 V, 20 mA or less at 12 V)				
	PNP [*5]	Normal: 860 mW or less (at 30 V. 30 mA or less at 24 V, 35 mA or less at 12 V) Eco on: 750 mW or less (at 30 V. 26 mA or less at 24 V, 28 mA or less at 12 V) Eco full: 540 mW or less (at 30 V. 19 mA or less at 24 V, 21 mA or less at 12 V)				
Environmental resistance	Operating ambient temperature	- 20 ºC to + 55 ºC (no freezing) [*3]				
	Operating ambient humidity	35 to 85 % RH (no condensation)				
	Vibration resistance	10 to 55 Hz, compound amplitude 1.5 mm, 2 hours for each of X, Y, Z axes				
	Shock resistance	500 m/s^2, 3 times for each of X, Y, Z axes				
Material	Housing	Amplifier body and dust cover material: Polycarbonate				
	Cable	PVC				
Housing dimensions		H 32.6 mm x W 9.8 mm x L 78.7 mm				
Weight		Approx. 75 g	Approx. 65 g	Approx. 20 g	Approx. 20 g	Approx. 20 g

*1 Counted as one output when units are added to NU series communication units.
*2 Input time is 25 ms (ON)/25 ms (OFF) only when an external tuning input is selected.
*3 The operating ambient temperature varies as shown below when units are added. For expansion, be sure to mount the units on the DIN rail (metallic plate) and prevent the output current for each unit from exceeding 20 mA.
- 20ºC to + 55ºC for 1 or 2 units added, - 20ºC to + 50ºC for 3 to 10 units added, - 20ºC to + 45ºC for 11 to 16 units added
*4 When connecting nine or more expansion units, ensure that the power voltage is 20 V or more.
*5 The maximum power consumption including load is 29.3 W.
*6 Use with the over current protection device which is rated 30 V or more and not more than 1 A.

5-2 Circuit Diagrams

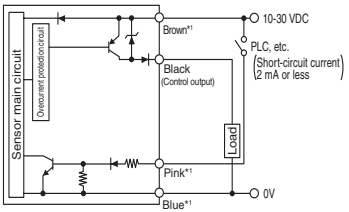
Cable Type Input/output Circuit Diagram

PS-N11N / N12N



*1 PS-N11N only

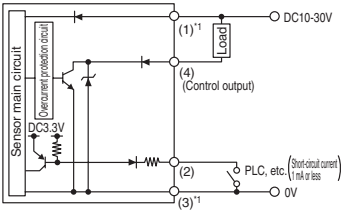
PS-N11P / N12P



*1 PS-N11P only

M8 Connector Type Input/output Circuit Diagram

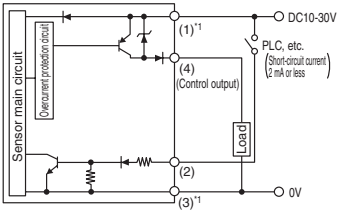
PS-N11CN / N12CN



*1 PS-N11CN only

M8 connector pin layout

PS-N11CP / N12CP



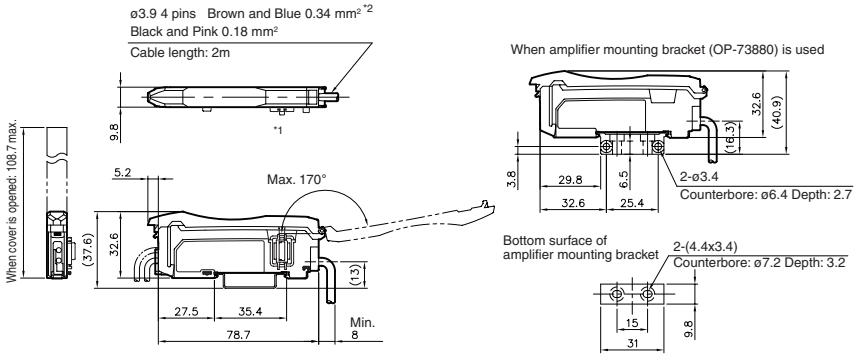
*1 PS-N11CP only

M8 connector pin layout

5 Specifications

Sensor Amplifier

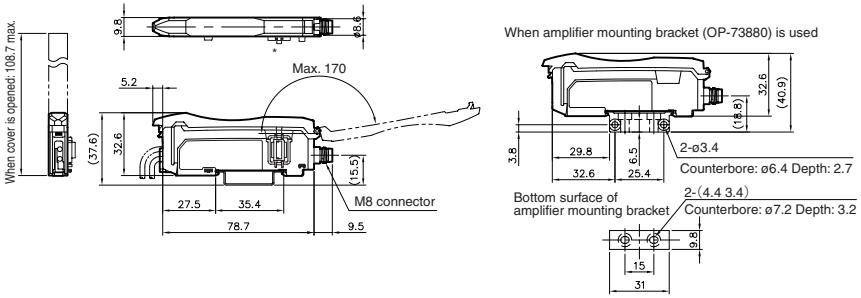
PS-N11☐ / N12☐ (cable type), PS-N10 (0-line type)



*1 This is not installed on the main unit (PS-N11☐).

*2 ø2.6 1 pins x Black 0.34 mm^2 on the expansion unit (PS-N12☐).
The cable is not installed on the 0-line type (PS-N10).

PS-N11C☐ / N12C☐ (M8 connector type)



* This is not installed on the main unit (PS-N11C☐).

MEMO

Appendix

6

This chapter provides troubleshooting instructions and initial settings (default values).

6-1 Troubleshooting 6-2
6-2 Factory Default Setting (Default Value) List 6-5
6-3 List of Recipe Function Settings 6-6
6-4 Restrictions on Each Detection Mode 6-7

Frequently Asked Questions

Category	Trouble	Cause	Action
Received light intensity display	The received light intensity is inconsistent. How can it be stabilized?	It may be affected by vibration, thermal characteristics caused by thermal changes, or the state of the workpiece surface, etc.	• Review the installation environment. • The received light intensity can be stably displayed at 100.0 by using the preset function. "Preset Function" (page 3-6) • When using the DATUM1/2 mode, the set value and received light intensity are both calibrated to maintain a set ratio. "Detection Mode" (page 4-8)
	The received light intensity is too low. How can it be increased?	This may be the result of a long detection distance. When using the reflective model, the intensity of the light reflected from the workpiece may be low, or there may be contamination. When using the thru-beam model, the beam axis may be deviated, etc.	• Review the installation environment and detection distance. • The received light intensity value can be increased by raising (delaying) the power mode. "Power Modes" (page 4-4) • The apparent received light intensity can be increased 4-fold by using the light intensity expansion setting. "Display Gain" (page 4-28) • The received light intensity can be increased by enabling the long-distance detection mode. "Long-Distance Detection Mode" (page 4-30)
Screen display	Nothing is displayed.	Eco (ALL) mode is selected.	• Disable the Eco function. "Power Save" (page 4-27)
		The power is cut off or the power cable is disconnected.	• Disable the Eco function.
	"-" scrolls from left to right on the display	Eco (FuLL) mode is selected.	• Disable the Eco function. "Power Save" (page 4-27)
		The sleep mode is enabled by the external input.	• Turn the external input OFF, or select a mode other than sleep mode transition input with the external input function. "Sleep mode transition input" (page 4-19)
Output operation	The received light intensity at which the output turns ON and turns OFF is slightly different.	The output timer is set.	• Check the output timer setting. "Output Timer" (page 4-7)
		Hysteresis	• A slight hysteresis is set to prevent chattering in the output. If this level of received light intensity is notable during detection, the detection tolerance may be low. Please review the detection details.

Category	Trouble	Cause	Action
Preset related	A value less than "100.0" is displayed even when the [PRESET] button is pressed.	The raw received light intensity is 50 or less. * (200 when using the received light intensity expansion setting.)	• Press and hold the [MODE] button and check the raw received light intensity level. Try adjusting the beam axis, removing contamination, or reviewing the installation environment. Take actions to raise the original received light intensity.
	When each preset function is executed, "---- ----" appears, and no change is seen.	The zero shift function is enabled.	• Disable the zero shift function. "Zero Shift Function" (page 3-16)
		The zero shift calibration (OSEt) is selected as the sensitivity setting.	• Select the sensitivity setting other than the zero shift calibration. "Sensitivity Setting" (page 4-4)
		The rising / falling edge detection mode is selected.	• Select the detection method other than the rising / falling edge detection mode. "Detection Mode" (page 4-8)
		Zero shift input is selected with the external input function.	• Select a mode other than zero shift input for the external input function. "External Input" (page 4-17)
		The difference in received light intensity during preset function execution and workpiece preset function execution is small.	• Provide a sufficient difference in received light intensity when using the preset function and work-preset function.
		The state was saturated when using the maximum sensitivity preset function and full auto preset function. The state was saturated when using either the preset function or workpiece preset function.	• Make sure that the received light intensity does not exceed the values listed in the Extension display on page 4-28.
Zero shift related	"---- ----" appears even when using the zero shift function, and each preset function with no effect is being used.	The preset function is enabled.	• Cancel each preset function. "Preset Function" (page 3-6)
		Preset input is selected with the external input function.	• Select a mode other than preset input with the external input function. "External Input" (page 4-17)
		The rising edge detection/falling edge detection mode is enabled.	• Set a detection mode other than rising edge detection/ falling edge detection mode with the detection mode settings. "Detection Mode" (page 4-8)
	Nothing happens even when the zero shift function is used.	The DATUM1/DATUM2 mode is enabled.	• Set a detection mode other than DATUM1/DATUM2 mode with the detection mode settings. "Detection Mode" (page 4-8)
DATUM related	The received light intensity is not calibrated to 100.0/.0 in the DATUM1/2 modes.	The raw received light intensity is 50 or less. * (200 when using the received light intensity expansion setting FuLL)	• Press and hold the [MODE] button and check the raw received light intensity level. Try adjusting the beam axis, removing contamination, or reviewing the installation environment. Take actions to raise the original received light intensity.
		The raw received light intensity is less than the warning level.	• Check the installation environment and confirm that the beam axis has not deviated and that the workpiece surface is not contaminated. • To continue calibration, increase the warning output level value. Calibration will not stop as frequently.
Sensitivity setting (calibration) related	Pressing the [SET] button has no effect.	The sensitivity setting (calibration) is restricted in specific detection modes.	• Change the detection mode or sensitivity setting referring to "Restrictions for Sensitivity Settings in Each Detection Mode" (page 6-7).
Others	Initializing all settings	-	• Initialize the setting. "Initialization of Settings (Reset to Initial Values)" (page 3-20)
	Cannot remember the key lock PIN number.	-	• Contact your nearest KEYENCE office.
	A setting error occurred when connecting to the communication series NU Series.	The setting is incorrect.	• Initialize the setting. "Initialization of Settings (Reset to Initial Values)" (page 3-20)

Error Displays and Corrective Actions

Error display	Cause	Solution
ErC	Overcurrent in the control output.	• Check the load and return the current within the rated range. • Check that the output wire is not contacting any other wire or frame.
ErH	Head cable is broken, or sensor head is not connected.	• Check that sensor head is connected. • Check whether head cable is not broken. • Check the head cable connection to the connector. • After checking, turn the power OFF and ON.
ErE	Failed to write/load the internal data.	• Turn the power OFF and ON. If the data is not recovered, initialize the settings.* "Initialization of Settings (Reset to Initial Values)" (page 3-20)
Loc	Key lock function is valid, or the power mode was changed in the MEGA mode fixed state.	• Disable the key lock. If the key lock cannot be disabled, it may be locked with a password, or locked by the NU Series communication unit. "Disabling the Key Operation" (page 3-22) • Check that the sensor amplifier is locked in MEGA mode. "Locking in MEGA Mode" (page 3-21)
The DTM indicator flashes.	Correction error in DATUM1 or DATUM 2 mode.	• Check that the received light intensity has not dropped. • Adjust the DATUM warning level. • Ensure that the received light intensity value is 50 or more.

* "ErE" display may remain if the PS-N10 Series is damaged.
For errors other than those listed above, contact your nearest KEYENCE office.

6-2 Factory Default Setting (Default Value) List

The default settings are as follows.

Function	Display	Default value	Reference page
Power mode	turb	turb (TURBO mode)	4-4
Sensitivity setting	SEt	Std (Normal sensitivity setting)	4-4
Output timer	toFF	---- (Timer disabled)	4-7
Detection mode	dEtc	Std (Received light intensity detection mode)	4-8
External input*1	in	oFF (External input off)	4-17
Display reverse	rEu	oFF (Normal display)	4-20
Sub-display	Sub	oFF (Sub-display off)	4-20
Preset saturation	Pr-H	on, 110P (110%)	4-25
Power save	Eco	oFF (Off)	4-27
Display gain	GAin	Std (Standard light intensity display)	4-28
Interference prevention	intF	Std (Normal operation)	4-29
Common key operation function*2	L inK	oFF (Disabled)	4-30
Long-distance detection mode	LonG	oFF (Disable long-distance detection mode)	4-30
Parameter Save by Ext-Input	ProG	YES (Will be written)	4-19

*1 Not available for the cable-type expansion unit and the 0-line type.
*2 Main unit only.

Item	Default value	Reference page
Setting value (Detection mode: Std selected)	50	4-4
Setting value (Detection mode: dtn1 selected)	5.0	4-9
Setting value (Detection mode: dtn2 selected)	5.0	4-11
Setting value (Detection mode: ArEA selected)	50	4-14
Setting value (Detection mode: _f¯d selected)	50	4-16
Setting value (Detection mode: ¯f_d selected)	50	4-16
Percentage calibration target value	-10P	4-5
Timer value	All 10	4-7

Reference Refer to "Initialization of Settings (Reset to Initial Values)" (page 3-20) for the initializing method.

6-3 List of Recipe Function Settings

Reference Refer to "Selecting Recipe" (page 3-18) for details on selecting recipes.

The following details are set using the recipe function.

Application item	Setting item	Setting		Reference page
Fall detection*1 (r-1 FALL)	Output condition	no	N.O.	3-4
	Output timer	Shot	One shot	4-7
	Detection mode	~L_d	Rising edge detection mode	4-16
	Sub display	HLd	Hold display	4-22
	Setting value	20	20	-
Percentage calibration (r-2 SEtP)	Output condition	d-on	D-on	3-4
	Sensitivity setting	SEtP	Percentage calibration	4-5
	Target percentage value	-5P	-5%	4-5
	Preset saturation level	101P	101%	4-25
	External input	SEt	External calibration input	4-17
Reflective background cancellation* (r-3 OSEt)	Sensitivity setting	OSEt	Zero shift calibration	4-6
	External input	ShFt	Zero shift input	4-17
Full light intensity* (r-4 nEGA)	Sensitivity setting	OSEt	Zero shift calibration	4-6
	External input	ShFt	Zero shift input	4-17
	Power mode	nEGA	MEGA mode	4-4
	Display gain	FuLL	Full	4-28
	Sub display	StdE	Extension display	4-20
Area detection (r-5 ArEA)	Detection mode	ArEA	Area detection mode	4-14
	Sensitivity setting	SEtP	Percentage calibration	4-5
	Percentage target value	-10P	-10%	4-5
0-datum*4 (r-6 0dtn)	Output condition	d-on	D-on	3-4
	Detection mode	dtn2	DATUM2 mode	4-11
	Sensitivity setting	SEtP	Percentage calibration	4-5
	Percentage target value	-5P	-5%	4-5
	External input	SEt	External calibration input	4-17
	Sub display	StdE	Extension display	4-20

*1 If the recipe r-3/r-4 is loaded by using the cable-type expansion unit (PS-N12□) and the 0-line type (PS-N10), the preset functions will be disabled. When using the preset function, read the application settings other than r-3/r-4. When the recipes are recalled, all setting items other than those described here are set to the default values.

"Initialization of Settings (Reset to Initial Values)" (page 3-20)

6-4 Restrictions on Each Detection Mode

Restrictions for Sensitivity Settings in Each Detection Mode

The sensitivity setting is limited according to the selected detection mode.
Refer to the chart below for details.

■ **Reading the table**

(Example) When detection mode is set to dtn1 (DATUM1 mode)

When the sensitivity setting is set to Std, two-point calibration, maximum sensitivity calibration and full auto calibration are enabled.
Positioning calibration, preset function and zero shift function operations are disabled.

Refer to page 4-4 for details of "Sensitivity Setting" and page 4-8 for details of "Detection Mode".

		Sensitivity setting*1							Preset function*4	Zero shift calibration*5
		Std (Standard)					SEtP (Percentage calibration)	OSEt (Zero shift calibration)		
		two-point calibration	Maximum sensitivity calibration	Full auto calibration	Positioning calibration*3	Edge detection*2				
Detection mode	Std	○	○	○	○		○	○	○	○
	dtn1	○	○	○			○			
	dtn2	○	○	○			○			
	ArEA	○	○	○	○		○		○	○
	_n_d					○				
	n_L_d					○				

*1 Items which are indicated as for the sensitivity setting will operate with Std calibration.

*2 In the edge detection mode, the bar display, even if SEtP/OSEt is selected for the sensitivity setting, the mode will function as edge detection calibration.

*3 Positioning calibration is not possible in the DATUM1 or DATUM2 modes. This will operate as two-point calibration.

*4 If the [PRESET] button is pressed in the DATUM1/DATUM2 mode, the received light intensity will be forcibly calibrated to 100.0/0.0. "---- ----" appears and no change is seen when the [PRESET] button is pressed in the edge detection mode.

*5 The zero shift operation does not function when the DATUM1/DATUM2 or edge detection mode is selected.

6-5 Index

This index provides a list of terms used in this document in alphabetical order.

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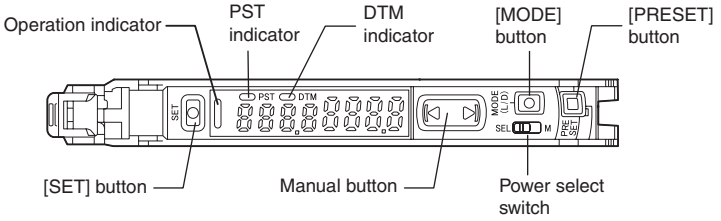
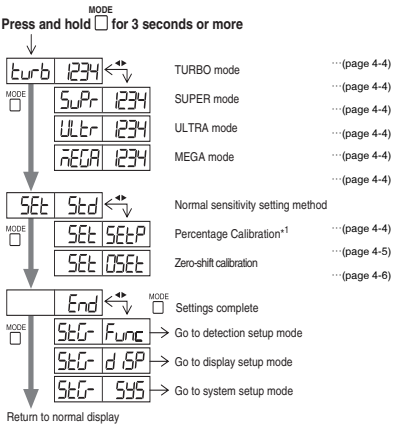


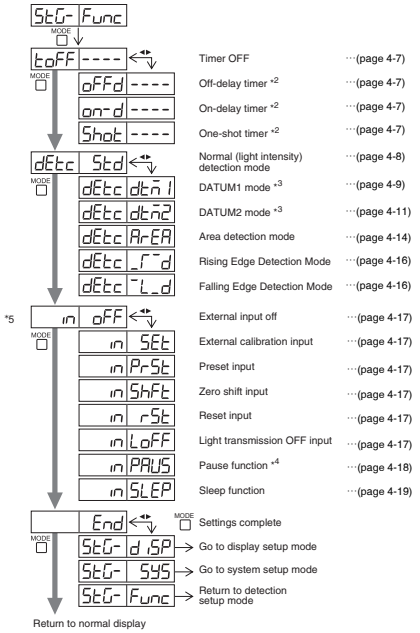
Purpose		Description	Operation procedures	Reference page
Changing the output	1	Change the output. (L-on/D-on)	1. Press the [MODE] button. 2. Switch with the ▷ (◁) button.	3-4
Adjusting the sensitivity and integrating the display to "100" and ".0"	2	Set the current received light intensity to "100.0". (Preset)	Reflective model: Press the [PRESET] button when a workpiece is present. Thrubeam/Retro-reflective model: Press the [PRESET] button when no workpiece is present.	3-6
	3	When preset is valid, register the received light intensity ".0". (Work-preset)	After step 2, press the [PRESET] button + ▷ button in the state to be set as ".0".	3-7
	4	Set the received light intensity slightly higher than when the setting was made, to "100.0". (Maximum sensitivity preset)	While the PST indicator is OFF, press and hold the [PRESET] button. Reflective model: When no workpiece is present. Thrubeam model: When a workpiece is present.	3-8
	5	Automatically register "100.0" and ".0" when workpiece passes by. (Full Auto preset)	Press and hold the [PRESET] button while the PST indicator is OFF.	3-9
	6	Cancel the various preset functions.	Press and hold the [PRESET] button.	3-6
Adjusting the sensitivity	7	Set the setting value at the midpoint between the received light intensity values when a workpiece is present and absent. (2-point calibration)	1. Press the [SET] button once when a workpiece is present. 2. Press the [SET] button once when no workpiece is present.	3-11
	8	Set the setting value slightly higher than the received light intensity value at which the setting was made. (Maximum sensitivity calibration)	Reflective model: Press and hold the [SET] button when no workpiece is present. Thrubeam model: Press and hold the [SET] button when a workpiece is present.	3-12
	9	Set the setting value automatically when a workpiece is passing through. (Full auto calibration)	Press and hold the [SET] button while the workpiece passes through.	3-13
	10	Set the setting value to the base point where the workpiece is positioned. (Positioning calibration)	1. Press the [SET] button once when no workpiece is present. 2. Press and hold the [SET] button at the positioning point.	3-14
	11	Finely adjust the setting value directly.	Press the ▷ (◁) button.	1-5
Shifting the received light intensity to ".0"	12	Set the current display to ".0". (Zero shift)	Press the [PRESET] button + ▷ button when the PST indicator is OFF.	3-16
	13	Cancel the zero shift function.	Press and hold the [PRESET] button.	3-16
Loading the recommended settings	14	Load the recommended settings. (Recipe function)	1. Press and hold the [SET] button and [PRESET] button. 2. Display the LoAd screen with the ▷ (◁) button, and press the [MODE] button. 3. Select the recipe such as r- 1 FALL with the ▷ (◁) button. 4. Press the [MODE] button to execute.	3-18
Initializing the settings	15	Initializing (Restore to factory default settings)	1. Press and hold the [SET] button and [PRESET] button. 2. Press the [MODE] button while on the r5t screen. 3. Select in it with the ▷ (◁) button. 4. Press the [MODE] button to execute.	3-20

Purpose		Description	Operation procedures	Reference page
Switching to the maximum received light intensity power mode	16	Adjust the power mode to the MEGA mode.	Set the power select switch to SEL M.	3-21
Preventing incorrect operations	17	Activating the key lock	Press and hold the [MODE] button and the ▷ (◁) button simultaneously.	3-21
	18	Deactivating the key lock	Press and hold the [MODE] button and the ▷ (◁) button simultaneously.	3-21
	19	Activating the password-protected key lock	1. Press the ▷ (◁) button10 times while holding down the [MODE] button. 2. Input the password with the ▷ (◁) button. 3. Press the [MODE] button to execute.	3-23
	20	Deactivating the password-protected key lock	1. Press the ▷ (◁) button 10 times while holding down the [MODE] button. 2. Input the password with the ▷ (◁) button. 3. Press the [MODE] button to deactivate the key lock.	3-23
Others (Advanced function settings, etc.)	21	Setting the advanced functions	Press and hold the [MODE] button.	4-1
	22	Switching the display to extended display or received light intensity hold display, etc. (sub-display)	After setting the sub-display with the advanced function settings, press the [MODE] button twice.	4-20
	23	Resetting the following values * Received light intensity hold value * Excess gain hold value	Press and hold the [MODE] button and [SET] button.	4-22 4-24
Saving and loading the settings	24	Saving the settings (custom save)	1. Press and hold the [SET] button and [PRE-SET] button. 2. Display the SAVE screen with the ▷ (◁) button, and press the [MODE] button. 3. Select YES with the ▷ (◁) button. 4. Press the [MODE] button to execute.	4-32
	25	Loading the settings (user reset)	1. Press and hold the [SET] button and [PRE-SET] button. 2. Press the [MODE] button on the rSt screen. 3. Select USEr with the ▷ (◁) button. 4. Press the [MODE] button to execute.	4-33

■ Basic Settings ···(page 4-4)



■ Detection Settings (Func) ···(page 4-7)


Timer OFF ···(page 4-7)
Off-delay timer *2 ···(page 4-7)
On-delay timer *2 ···(page 4-7)
One-shot timer *2 ···(page 4-7)
Normal (light intensity) detection mode ···(page 4-8)
DATUM1 mode *3 ···(page 4-9)
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Area detection mode ···(page 4-14)
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External input off ···(page 4-17)
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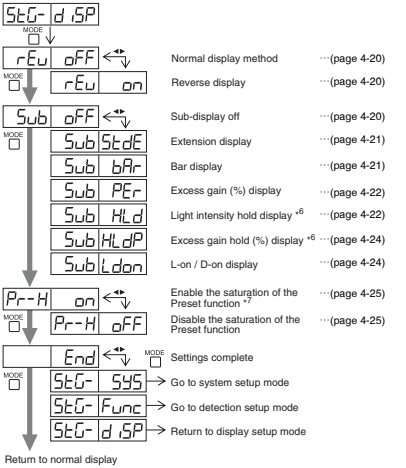
Pause function *4 ···(page 4-18)
Sleep function ···(page 4-19)
Settings complete
Go to display setup mode
Go to system setup mode
Return to detection setup mode
Return to normal display

■ Display Settings (diSP) ···(page 4-20)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Reverse display ···(page 4-20)
Sub-display off ···(page 4-20)
Extension display ···(page 4-21)
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Light intensity hold display *6 ···(page 4-22)
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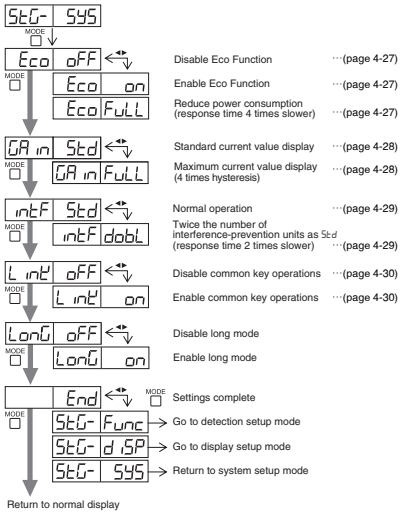
Disable the saturation of the Preset function ···(page 4-25)
Settings complete
Go to system setup mode
Go to detection setup mode
Return to display setup mode
Return to normal display

■ System Settings (SYS) ···(page 4-27)


Disable Eco Function ···(page 4-27)
Enable Eco Function ···(page 4-27)
Reduce power consumption (response time 4 times slower) ···(page 4-27)
Standard current value display ···(page 4-28)
Maximum current value display (4 times hysteresis) ···(page 4-28)
Normal operation ···(page 4-29)
Twice the number of interference-prevention units as Std (response time 2 times slower) ···(page 4-29)
*8
Disable common key operations ···(page 4-30)
Enable common key operations ···(page 4-30)
*9
Disable long mode
Enable long mode
Settings complete
Go to detection setup mode
Go to display setup mode
Return to system setup mode
Return to normal display

*1 You can press the MODE button to set between the range of -99P and 99P.
*2 Press the MODE button to set between the range of 1 and 9999 (ms).
*3 Press the MODE button to set the adjustment sensitivity to a range of between LEU 1 and LEU3 and set the warning level to a range of between 0P and 100P.
*4 Press the MODE button to switch between oFF/on/tEEP.
*5 This display does not appear on the cable-type expansion unit (PS-N12□) and the 0-line type (PS-N10).
*6 Press the MODE button to toggle between 5td/P¯P_/b¯b_/P_b¯/P¯b_.
*7 Press the MODE button to set between the range of 100P and 200P.
*8 Main unit only.
*9 The PS-47(C), PS-48, PS-49(C), PS-58 and PS-206 do not support long mode. Do not select long mode when using these sensor heads.

Reference

- Press the MODE button and the button simultaneously to return to the previous setting option.
- When the MODE button is held down, the settings menu will end.

Revision History

Date of printing	Edition	Description
April, 2011	First edition	

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